NIMCET 2008

MATHEMATICS

1. If f(x) is a polynomial satisfying $f(x)f\left(\frac{1}{x}\right) = f(x) + f\left(\frac{1}{x}\right)$ and f(3) = 28, then f(4) is given by

(A) 63 (B) 65 (C) 67 (D) 68

2. Suppose $P_1, P_2, \ldots\ldots P_{30}$ are thirty sets each enhancing 5 elements and $Q_1, Q_2, \ldots Q_n$ are n sets with 3 elements each. Let $\bigcup_{i=1}^{30} P_i = \bigcup_{j=1}^{30} Q_j = S$ and each element of S belong to exactly 10 of P_is and exactly 9 of the Q_js. Then, n is equal to

(A) 15 (B) 3 (C) 45 (D) None of these

3. The number of functions f from the set A = {0, 1, 2} into the set B = {0,1, 2, 3, 4, 5,6,7} such that $f(i) \le f(j)$ for $i<j$ and $i, j \in A$ is

(A) ${}^8C_3$ (B) ${}^8C_3 + 2({}^8C_2)$ (C) ${}^{10}C_3$ (D) None of these

4. The value of $\int_0^{\pi/2} \frac{dx}{1+\tan^3 x}$ is

(A) 0 (B) 1 (C) $\frac{\pi}{4}$ (D) $\frac{\pi}{2}$

5. The integer n for which $\lim_{x \to 0}\left(\frac{(\cos x - 1)(\cos x - e^x)}{x^n}\right)$ is a finite non–zero number is

(A) 1 (B) 2 (C) 3 (D) 4

6. The area of the plane bounded by the curves $y=\sqrt{x}$, $x \in [0,1]$, $y = x^2$, $x \in [1,2]$ and $y = -x^2 + 2x + 4$, $x \in [0,2]$ is

(A) $\frac{10}{7}$ (B) $\frac{19}{3}$ (C) $\frac{3}{5}$ (D) $\frac{4}{3}$

7. The function $f(x) = 2\sin x + \sin 2x$, $x \in [0, 2\pi]$ has absolute maximum and minimum at

(A) $\frac{\pi}{3}, \frac{5\pi}{3}$ (B) $\frac{\pi}{3}, \pi$ (C) $\frac{5\pi}{3}, \pi$ (D) None of these

8. If $y=\sec^{-1}\left(\frac{x+1}{x-1}\right) + \sin^{-1}\left(\frac{x-1}{x+1}\right)$, $x \in [0, \infty]$ and $x \ne 1$, then $\frac{dy}{dx}$ is equal to

(A) 1 (B) $\frac{x-1}{x+1}$ (C) 0 (D) $\frac{x+1}{x-1}$

9. If two events A and B such that P(A') = 0.3, P (B) = 0.5 and P $(A \cap B) = 0.3$, then P (B/A∪B') is

(A) $\frac{1}{4}$ (B) 3/8 (C) 1/8 (D) None of these

10. If y = mx bisects the angle between the lines $x^2(\tan^2\theta + \cos^2\theta) + 2xy\tan\theta - y^2\sin\theta = 0$ when $\theta = \pi/3$, then the value of $\sqrt{3}m^2 + 4m$ is

(A) 1 (B) $\frac{1}{\sqrt{3}}$ (C) $\sqrt{3}$ (D) $7\sqrt{3}$

11. If f: R→R and g: R→R are continuous functions, then the value of the integral $\int_{-\pi/2}^{\pi/2} [f(x) + f(-x)][g(x) - g(-x)]\,dx$ is

(A) π (B) 1 (C) –1 (D) 0

12. The maximum value of $(\cos \alpha_1).(\cos \alpha_2)\ldots.. (\cos \alpha_n)$ where $0 \le \alpha_1, \alpha_2, \ldots. \alpha_n \le \pi$ and $(\cot \alpha_1)\ (\cot \alpha_2) \ldots\ldots (\cot \alpha_n) = 1$ is

(A) $\frac{1}{2^{n/2}}$ (B) $\frac{1}{2^n}$ (C) $\frac{1}{2n}$ (D) 1

13. Let M be a point inside the triangle, ABC. Then which one of the following is true?

(A) AB + AC < MB + MC (B) AB + AC > MB + MC

(C) AB + AC ≤ MB + MC (D) None of these

14. A line L has intercepts 'a' and 'b' on the coordinate axes. When the axes are rotated through a given angle, keeping the origin fixed, the same line has intercepts 'p' and 'q'. Which of the following statements is true?

(A) $a^2 + b^2 = p^2 + q^2$ (B) $\frac{1}{a^2} + \frac{1}{b^2} = \frac{1}{p^2} + \frac{1}{q^2}$

(C) $a^2 + p^2 = b^2 + q^2$ (C) $\frac{1}{a^2} + \frac{1}{q^2} = \frac{1}{b^2} + \frac{1}{q^2}$

15. If a, b are the roots of $x^2 + px + 1 = 0$ and c, d are the roots of $x^2 + qx + 1 = 0$, the value of E = (a – c) (b – c) (a + d) (b + d) is

(A) $p^2 - q^2$ (B) $q^2 - p^2$ (C) $q^2 + p^2$ (D) None of these

16. If f(x) + f(1– x) = 2, then the value of $f\left(\frac{1}{2001}\right) + f\left(\frac{2}{2001}\right) + \ldots f\left(\frac{2000}{2001}\right)$ is

(A) 2000 (B) 2001 (C) 1999 (D) 1998

17. Suppose a, b, c are in A.P. with common difference d. Then $e^{1/c}$, $e^{b/ac}$, $e^{1/a}$ are

(A) A.P. (B) G.P. (C) H.P. (D) None of these

18. Let α and β be the roots of the equation $x^2 + x + 1 = 0$. The equation whose roots are α^{19} and β^7 is

(A) $x^2 - x - 1 = 0$ (B) $x^2 + x - 1 = 0$ (C) $x^2 - x + 1 = 0$ (D) $x^2 + x + 1 = 0$

19. In the expression $(x + 1)(x + 4)(x + 9)(x + 16) \ldots.. (x + 400)$ the coefficient of x^{19} is

(A) 2870 (B) 210 (C) 4001 (D) 1900

20. The value of $y = 0.36 \log_{0.25}\left(\frac{1}{3} + \frac{1}{3^2} + \ldots.\right)$ is

(A) 0.1296 (B) 0.18 (C) 0.6 (D) 0.25

21. If $H_1, H_2, \ldots. H_n$ are n harmonic means between a and b, $a \ne b$, then the value of $\frac{H_1 + a}{H_1 - a} + \frac{H_n + b}{H_n - b}$ is equal to

(A) n +1 (B) n – 1 (C) 2n (D) 2n + 3

22. For $a > 0$, $a \ne 1$, the number of values of x satisfying the equation $2\log_x(a) + \log_{ax}(a) + 3\log_{a^2 x}(a) = 0$ is

(A) 2 (B) 3 (C) 4 (D) 5

23. An eight digit number divisible by 9 is to formed by using 8 digits out of the digits 0, 1,...9 without replacement. The number of ways in which this can be done is

(A) 9! (B) 2(7!) (C) 4(7!) (D) 36 (7!)

24. The number of ordered pairs (m, n), $m, n \in \{1, 2, \ldots.. 100\}$ such that $7^m + 7^n$ is divisible by 5 is

(A) 1250 (B) 2000 (C) 2500 (D) 5000

25. If a, b, c are the roots of the equation $x^3 - 3px^2 + 3qx - 1 = 0$, then the centroied the triangle with vertices $\left(a, \frac{1}{a}\right), \left(b, \frac{1}{b}\right)$ and $\left(c, \frac{1}{c}\right)$ is at the point

(A) (p, q) (B) (p/3, q/3) (C) (p + q, p – q) (D) (3p, 3q)

26. Equation of the common tangent touching the circle $(x - 3)^2 + y^2 = 9$ and the parabola $y^2 = 4x$ above the x-axis is:

(A) $\sqrt{3}y = 3x + 1$ (B) $\sqrt{3}y = -(x + 3)$ (C) $\sqrt{3}y = x + 3$ (D) $\sqrt{3}y = -(3x + 1)$

27. The number of roots of the equation $|x^2 - x - 6| = x + 2$ is:

(A) 2 (B) 3 (C) 4 (D) none of these

28. A pair of unbiased dice is rolled together till a sum of either 5 or 7 is obtained. The probability that 5 comes before 7 is

(A) 3/5 (B) 2/5 (C) 4/5 (D) none of these

29. A letter is taken at random from the letters of the word 'STATISTICS' and another letter is taken at random from the letters of the word 'ASSISTANT'. The probability that they are the same letter is:

(A) $\frac{1}{45}$ (B) $\frac{13}{90}$ (C) 19/90 (D) 5/8

30. A bag contains 6 red and 4 green balls. A fair dice is rolled and a number of balls equals to that appearing on the dice is chosen from the bag at random. The probability that all the balls selected are red is:

(A) $\frac{1}{3}$ (B) $\frac{3}{10}$ (C) $\frac{1}{8}$ (D) none of these

31. The value of λ for which the volume of parallelepiped formed by the vectors $\hat{i} + \lambda\hat{j} + \hat{k}$, $\hat{j} + \lambda\hat{k}$ and $\lambda\hat{i} + \hat{k}$ is minimum is given by:

(A) –3 (B) 3 (C) $\frac{1}{\sqrt{3}}$ (D) $-\sqrt{3}$

32. A six faced dice is a biased one. It is thrice more likely to show an odd number that to show an even number. It is thrown twice. The probability that the sum of the numbers in the two throws is even, is:

(A) 4/8 (B) 5/8 (C) 6/8 (D) 7/8

33. A letter is known to have come from either TATANAGAR or CALCUTTA. On the envelope, just two consecutive letters, TA, are visible. The probability that the letter has come from CALCUTTA is:

(A) 4/11 (B) 1/3 (C) 5/12 (D) None of these

34. If cos α + cos β = a, sin α + sin β = b and θ is the arithmetic mean between α and β, then sin 2θ + cos 2θ is equal to

(A) $\frac{(a+b)^2}{(a-b)^2}$ (B) $\frac{(a-b)^2}{(a+b)^2}$ (C) $\frac{a^2-b^2}{a^2+b^2}$ (D) None of these

35. If (1+ tan 1°) (1+ tan 2°) ..... (1+ tan 45°) = 2^n, then the value of n is

(A) 21 (B) 22 (C) 23 (D) 24

36. The value of sin 12° sin 48° sin 54° is

(A) sin 30° (B) $\sin^2 30°$ (C) $\sin^3 30°$ (D) $\text{Cos}^3 30°$

37. The value of λ such that the four points whose position vectors are $3\hat{i} - 2\hat{j} + \lambda\hat{k}$, $6\hat{i} + 3\hat{j} + \hat{k}$, $5\hat{i} + 7\hat{j} + 3\hat{k}$ and $2\hat{i} + 2\hat{j} + 6\hat{k}$ are coplanar is

(A) –6 (B) 4 (C) 5 (D) 8

38. Let $\vec{A} = 2\hat{i} + \hat{j} - 2\hat{k}$ and $\vec{B} = \hat{i} + \hat{j}$. If $\vec{C}$ is a vector such that $\vec{A}.\vec{C} = |\vec{C}|, |\vec{C} - \vec{A}| = 2\sqrt{2}$ and the angle between $\vec{A} \times \vec{B}$ and C is 30°, then $|(\vec{A} \times \vec{B}) \times \vec{C}|$ is equal to

(A) $\frac{2}{3}$ (B) $\frac{3}{2}$ (C) 2 (D) 3

39. A rigid body is rotating at the rate of 3 radians per second about an axis AB, where A and B are the points (1, –2, 1) and (3, –4, 2). The velocity of the point P at (5, –1, –1) of the body is

(A) $3\hat{i} + 8\hat{j} + 10\hat{k}$ (B) $\frac{3\hat{i} + 8\hat{j} + 10\hat{k}}{3}$ (C) $\frac{2\hat{i} - 2\hat{j} + \hat{k}}{3}$ (D) $4\hat{i} + \hat{j} - 2\hat{k}$

40. If $\vec{A} + \vec{B} + \vec{C} = \vec{0}, |\vec{A}| = 3, |\vec{B}| = 5, |\vec{C}| = 7$, then the angle between $\vec{A}$ and $\vec{B}$ is:

(A) $\frac{\pi}{6}$ (B) $\frac{\pi}{3}$ (C) $\frac{5\pi}{3}$ (D) $\frac{\pi}{4}$

ANALYTICAL REASONING

Read the following information carefully and then answer the questions from 41 to 45:

i) P ψ Q means P is mother of Q
ii) P ∈ Q means P is sister of Q
iii) P $ Q means P is father of Q
iv) P # Q means P is brother of Q

41. Which of the following means N is definitely daughter of K?
(A) K $ L # M # N (B) M ψ K $ N ∈ L (C) K ψ M # L∈N (D)L ψ K $ N # M

42. Which of the following means R is brother of T?
(A) R ψ S # U $ T (B) U ψ R # S # T (C) U ψ R ∈ S ψ T (D) T # S $ Q ∈ R

43. Which of the following means X is real grandmother of Y?
(A) X ∈ Z ψ K $ L # Y (B) Y ψ K $ X # L (C) Y # L $ K ψ X ∈ Z (D) K # X ψ Z # L $ Y

44. If K ψ L ∈ M # N, then how K is related with N?
(A) Mother (B) Aunt (C) Great Aunt (D) Grandmother

45. Which of the following means K is nephew of M?
(A) N # M $ L # K ∈ O (B) K # L $ N ∈ O $ M (C) L ψ O # M $ O ψ K (D) M # N $ L # K $ O

46. There are six houses in a row. Mr Lal has Mr. Babu and Mr. Anil as neighbours. Mr. Bhatia has Mr. Gupta and Mr. Sharma as neighbours. Mr. Gupta's house is not next to Mr. Babu or Mr. Anil and Mr. Sharma does not live next to Mr. Anil. Who are Mr. Babu's next-door neighbours?
(A) Mr. Lal and Mr. Bhatia (B) Mr. Lal and Mr. Anil
(C) Mr. Sharma and Mr. Lal (D) Only Mr. Lal

47. A watch which gains 10 seconds in 5 minutes was set correct at 9 a.m. When the watch indicated 20 minutes past 7 o' clock, the same evening, the true time is:
(A) 7 p.m. (B) 7.40 p.m. (C) 7.10 p.m. (D) 8 p.m.

48. A boy observes the reflection of a clock in a mirror. The time observed by the boy in the mirror is 3 hours 45 minutes. What is the actual time shown in the clock?
(A) 8 hours 45 minutes (B) 9 hours 45 minutes (C) 8 hours 15 minutes (D) 9 hours 15 minutes

49. Gold is 19 times as heavy as water and copper is 9 times as heavy as water. In what ratio should these be mixed to get an alloy 15 times as heavy as water?
(A) 1:2 (B) 2:3 (C) 3:2 (D) 1:1

50. In an objective type examination, 120 objective type questions are there; each with 4 options P,Q,R and S. A candidate can choose either one of these options or can leave the question unanswered. How many different ways exist for answering this question paper?
(A) 5^{120} (B) 4^{120} (C) 120^5 (D) 120^4

51. You are given two (unmarked) containers of capacity 9 liters and 4 liters, and a huge tank of water. Need is to get a measure of exactly 6 liters of water. A move is either filling a container completely or emptying a container (either fully of partly).The smallest number of moves needed to do this task is
(A) 8 (B) 10 (C) 12 (D) None of these

52. What is the next letter in the series
O T T F F S S E N _____
(A) T (B) O (C) E (D) N

53. What is the diameter of the largest circle that can be drawn on a chessboard so that it's entire circumference gets covered by the black squares and no part of the circumference falls on any white space, given that the chessboard has black and white square of size one inch.

(A) 1 inch (B) $\sqrt{2}$ inches (C) $\sqrt{10}$ inches (D) $2\sqrt{3}$ inches

54. A car is filled with $4\frac{1}{2}$ liters of fuel for a round trip. If the amount of fuel taken while going is $\frac{1}{4}$th more than the amount taken for coming, what is the amount of fuel consumed while coming back?
(A) 1.5 (B) 2 (C) 1.75 (D) None of these

55. Which of the following are greater than x when $x = \frac{9}{11}$?

I) $\frac{1}{x}$

II) $\frac{x+1}{x}$

III) $\frac{x+1}{x-1}$

(A) I Only (B) I and II only (C) I and III only (D) II and III only

56. Four friends – Arjan, Bhuvan, Guran and Lakha were comparing the number of sheep that they owned. It was found that Guran has ten more sheep than Lakha. If Arjan gave one third to Bhuvan, and Bhuvan gave a quarter of what he then held to Guran, who then passed on fifth of his holding to Lakha, they would all have an equal number of sheep. How many sheep did each of them possess? Give the minimal possible answer.
(A) 200, 105, 110, 100 (B) 90, 55, 55, 45 (C) 180, 110, 110, 100 (D) 90, 50, 55, 45

57. In a class, six students P, Q, R, S, T and U are the top six rank holders, not necessarily in the same order. R did not get the 4th rank. P's rank is higher than U's and R's but lower than Q's. Among these six rankers, here are four students whose ranks are lower than S's rank and five students whose ranks are above that of T. Who is ranked 5th in the class?
(A) U (B) T (C) R (D) None of these

58. Three players – Aalu, Kachaalu and Bhalu were playing pocker and suddenly started to quarrel among themselves blaming each other for cheating. It was found out that at least one person among the three cheated. When they were asked who cheated, their replies were as follows:
Aalu: I did not cheat, Kachaalu cheated
Kachaalu: I did not cheat, both Aalu and Bhalu cheated.
Bhalu: I did not cheat, only Kachaalu did not cheat.
If exactly one person among them always spoke truth, another always lied and the third alternated between the truth and lie, then which of the following statements can never be true in any case?
(A) Only Aalu and Bhalu cheated (B) Only Aalu and Bhalu did not cheat
(C) Bhalu always spoke the truth (D) Bhalu alternated between truth and lie.

59. If x and y are the two digits of the number 565xy such that this number is divisible by 80, then x + y equal to
(A) 2 (B) 3 (C) 8 (D) 6

60. If both 7^2 and 3^3 are factors of the number $(a\times11^3\times6^2\times13^{11})$, then what is the smallest possible value of a?
(A) 1323 (B) 147 (C) 21 (D) 3087

61. Let x, y and z be distinct integers. x and y are odd and positive, and z is even and positive. Which one of the following statements cannot be true?
(A) $(x - z)^2y$ is even (B) $(x - z)y^2$ is odd (C) $(x - z)y$ is odd (D) $(x - y)^2z$ is even

62. From a height of 16 mts a ball fell down and each time it bounces half the distance back. What is the distance traveled?
(A) 45 mts (B) ∞ (C) 48 mts (D) 24 mts

63. If a man walks at the rate of 4 kmph, he misses a train by only 6 minute. However, if he walks at the rate of 5 kmph he reaches the station 6 minutes before the arrival of the train. Find the distance covered by him to reach the station.
(A) 4 (B) 7 (C) 9 (D) 5

Read the following statements and answer questions from 64 to 67:
The office staff of XYZ corporation presently consists of three bookkeepers, P,Q,R and 5 secretaries S,T,U,V,W. The management is planning to open a new office in another city using 2 bookkeepers and 3 secretaries of the present staff. To do so they plan to separate certain individuals who don't function well together. The following guidelines were established to set up the new office:

i) Bookkeepers P and R are constantly finding fault with one another and should not be sent together to the new office as a team.
ii) R and T function well alone but not as a team, they should be separated.
iii) S and V have not been on speaking terms and shouldn't go together.
iv) Since S and U have been competing for promotion they shouldn't be a team.

64. If P is to be moved as one of the bookkeepers, which of the following cannot be a possible working unit?
(a) PQSTW (b) PQSVW (c) PQTUW (d) PQTVW

65. If R and U are moved to the new office, how many combinations are possible?
(a) 1 (b) 2 (c) 3 (d) 4

66. If R is sent to the new office, which member of the staff cannot go with R?
(a) Q (b) S (c) W (d) V

67. If S goes to the new office, which of the following is true?
(a) Only R cannot go (b) Only P cannot go
(c) Only P and R cannot go (d) R cannot go and W must go

68. Substitutes digits for the letters to make the following relation true

STILL
+WITHIN
LIMITS

Note that the leftmost letter can't be zero in any word. Also, there must be a one-to-one mapping between digits and letters, e.g. if you substitute 3 for the letter S, no other letter can be 3 and all other S in the puzzle must be 3.
(A) 98533 + 258056 = 356589 (B) 41211 + 527013 = 938224
(C) 98533 + 158056 = 256589 (D) 47166 + 517013 = 614179

69. 12 members were present at a board meeting. Each member shook hands with all of other members before and after the meeting. How any hand shakes were there?
(A) 118 (B) 127 (C) 132 (D) 264

70. The letters P, Q, R, S, T, U and V not necessarily in that order represents seven consecutive integers from 22 to 23
* U is as much less than Q as R is greater than S
* V is greater than U
* Q is the middle term
* P is 3 greater than S

Can you find the sequence of letters from the lowest value of the highest value?
(A) PVSQRTU (B) SUTQPRV (C) USVQPRT (D) TUSQRPV

71. There were a total of 10 bicycles and tricycles. If the total number of wheels was 24, how many tricycles were there?
(A) 4 (B) 6 (C) 8 (D) 2

72. A person travels on a cycle from home to church on a straight road with wind against him. He took 4 hours to reach there. On the way back to the home, he took 3 hours to reach as wind was in the same direction. If there is no wind, how much time does he take to travel from home to church?
(A) 3 hours 35 minutes 12 seconds (B) 3 hours 32 minutes 32 seconds
(C) 3 hours 30 minutes 00 seconds (D) 3 hours 25 minutes 42 seconds.

73. What are the next three numbers in the given series
1 1 2 1 2 2 3 1 2 2 3 2 3 3 4 1 2 2 3 2 3 3 4 2 3 3?
(A) 2, 3, 4 (B) 2, 3, 2 (C) 1, 2, 3 (D) 4, 3, 4

74. In the middle of the confounded desert, there is the lost city of "Ash". To reach it, I will have to travel overland by foot from the coast. On a trek like this, each person can only carry enough rations for five days and the farthest we can travel in one day is 30 miles. Also, the city is 120 miles from the starting point. What I am trying to figure out is the fewest number of persons, including myself, that I will need in our group so that I can reach the city, stay overnight, and then return to the coat without running out of supplies. How many persons (including myself) will I need to accomplish this mission?
(A) 5 (B) 6 (C) 4 (D) 3

75. A woman took a certain number of eggs to the market and sold some of them. The next day, through her poultry industry the number left over had been doubled, and she sold the same number as the previous day. On the third day the new remainder was tripled, and she sold the same number as before. On he fourth day the remainder was quadrupled, and her sales were the same as before. On the fifth day what had been left over were quintupled, yet she sold exactly the same as on all the pervious occasions and so disposed of her entire stock. What is the smallest number of eggs she could have taken to the market the first day, and how many did she sell daily?
(A) 110, 50 (B) 127, 65 (C) 100, 60 (D) 103, 60

76. The Bulls, Pacers, Lakers and Jazz ran for a contest.
Anup, Sujit, John made the following statements regarding results.
* Anup said either Bulls or Jazz will definitely win
* Sujit said he is confident that Bulls will not win.
* John said he is confident that neither Jazz nor Lakers will win.
When the result came, it was found that only one of the above three had made a correct statement. Who has made the correct statement and who has won the contest?
(A) Anup, Bulls (B) Joh, Pacers (C) Sujit, Lakers (D) Sujit, Jazz

77. A certain street has 1000 buildings. A sing-maker is contracted to number the houses from 1 to 1000. How many zeroes will be need?
(A) 128 (B) 190 (C) 181 (D) None of these

78. Examine the following sequence of numbers
1
11
21
1211
111221
31211
13112221
1113213211
31131211131221
What are the next two numbers in the given series?
(A) 1321131112211 1231131 and 112132113212221 11131221133
(B) 23113112211 132113111 and 1112132113212221 1131221133
(C) 1123113112211 1321131 and 11131221212221 133112132113
(D) 13211311123113112211 and 1113122113311213211321222 1

79. There were two men standing on a street. The one says to the other, "I have 3 daughters, the product of their ages is 36. What is the age of the OLDEST daughter?" The second guy says, "I need more information." So, the first guy says, "The sum of their ages is equal to the address of the house across the street. The second guy looks at the address and says, "I still need more information. "So, the first guy says, "My oldest daughter wears a red dress."
(A) 9 (B) 6 (C) 12 (D) 4

80. Three Gold (G) coins, three Silver (S) coins and three Copper (C) coins are arranged in a single row as follow: G S C G S C G S C
* Only 2 adjacent unlike coins can be moved at any one time.
* The moved coins must be in contact with at least one other coin in line. i.e. no pair of coins is to be moved and placed away from the remaining ones.

* No coin pairs can be reversed i.e. a S-C combination must remain in that order in its new position when it is moved.
What is the minimum number of moves required to get all he coins in following order? C C C S S S G G G
(A) 6 (B) 9 (C) 8 (D) 12

81. Mr. and Mrs. Birla and Mr. and Mrs. Tata competed in a Chess tournament. Of the three games played:
1. In only the first game were the two players married to each other.
2. The men won two games and the women won one game.
3. The Birlas won more game than the Tatas.
4. Anyone who lost a game did not play a subsequent game.
Who did not lose a game?
(A) Mr. Birla (B) Mrs. Birla (C) Mr. Tata (D) Mrs. Tata

82. Of the three numbers, second is twice the first and is also thrice the third. If the average of three numbers is 44, the largest number is
(A) 24 (B) 36 (C) 72 (D) 108

83. Large, medium and small ships are used to bring water. 4 large ships carry as much water as 7 small ships. 3 medium ships carry the same amount of water as 2 large ships and 1 small ship. 15 large, 7 medium and 14 small ships, each made 36 journey and rough a certain quantity of water. In how many journey would 12 large, 14 medium and 21 small ships bring the same quantity of water?
(A) 32 (B) 25 (C) 29 (D) 49

84. Five Men, P, Q, R, S and T read newspaper. The one who reads first gives it to R. The one who reads last had taken it from P. T was not the first or the last to read. There were two readers between Q an P. To whom did Q pass the newspaper?
(A) R (B) P (C) S (D) T

85. An airline has a certain free luggage allowance and charges for excess luggage at a fix rate per k.g. Two passengers, Raja and Rahim have 60 kg. of luggage between them, and are charged Rs. 1,200 and Rs. 2,400, respectively for excess luggage. Had the entire luggage belonged to one of them, the excess luggage charge would have been Rs. 5,400. What is the weight of Rahim's luggage?
(A) 20 kg. (B) 25 kg. (C) 30 kg. (D) 35 kg.

86. A group of 630 children is arranged in rows for a group photograph session. Each row contains three fewer children than the row in front of it. What number of rows is not possible?
(A)3 (B) 4 (C) 5 (D) 6

Read the following passage and answer the questions from 87 to 90:
Sports (and game) persons P,Q,R.S,T,U and of a university are at the Bangalore Airport. Five of them are selected players and leaving to participate in the Grand Sports Event in five different events cricket, chess, carom, badminton and table tennis being held at 5 different cities Mumbai, Chennai, Kolkatta, Delhi and Hyderabad.

a) P is going to Delhi, but he does not play either cricket or carom.
b) Q has come to give send off to R, who is a chess player and is not leading to either Mumbai or Hyderabad.
c) S is leaving to Kolkatta to play table tennis.
d) U is leaving to Mumbai but he does not lay either badminton or cricket.
e) T is not a selected player.

87. Who plays badminton?
(A) P (B) Q (C) R (D) S

88. Cricketer goes to
(A) Mumbai (B) Hyderabad (C) Chennai (D) Delhi

89. Player of which game goes to Delhi?
(A) Badminton (B) Chess (C) Cricket (D) Table Tennis

90. Who plays chess and where is he going?
(A) R and Chennai (B) S and Mumbai (C) U and Delhi (D) None of these

COMPUTER AWARENESS

91. Which of the following is (are) true about virtual memory systems that uses pages ?
I. The virtual address space can be larger than the about of physical memory.
II. Programs must be resident in main memory throughout their execution.
III. Pages correspond to semantic characteristics of the program
(A) I only (B) II Only (C) I and II (D) I and III

92. The minimum number of gates needed to implement the Boolean function
$f(x,y,z) = z(x+y) + \overline{(\bar{z}+x+y)(\bar{x}+\bar{y})}$ is
(A) 2 (B) 3 (C) 4 (D) 5

93. How many bits are required to store an ASCII character ?
(A) 7 (B) 6 (C) 8 (D) None of the above

94. A CPU has an arithmetic unit that adds bytes and then sets its V, C and Z flag is as follows: The V-bit is set if arithmetic overflow occurs. The C-bit is set if a carry-out is generated from the most significant bit during an operation. The Z-bit is set if the result is zero/ What are the values of V, C and Z flag bits respectively after the 8-bit bytes 1100 1100 and 1000 1111 are added ?
(A) 0, 0, 0 (B) 1, 1, 0 (C) 1, 1, 1 (D) 0, 1, 0

95. Which one of he following statements is always true?
(A) A compiled program used more memory than an interpreted program.
(B) A compiler converts a program to a lower level language for execution.
(C) A compiler for a high level language takes less memory than it's interpreter.
(D) Complied programs take more time to execute than interpreted programs.

96. Floating point numbers in a computer are represented using a 10-bit mantissa (including a sign bit) a 7-bit exponent (including a sign bit). What is the approximate value of a the maximum number, which can be represented ? Assume that the mantissa is stored in the normalized form, that is, without leading zeroes.
(A) 2^{128} (B) 2^{127} (C) 2^{64} (D) 2^{63}

97. The capacity of a memory unit is defined by the number of words multiplied by the number of bits per word. How many separate address and data line are needed for a memory of 4K × 16?
(A) 10 address lines and 16 data lines (B) 12 address lines and 10 data lines
(C) 12 address lines and 16 data lines (C) 12 address lines and 8 data lines

98. The main disadvantage of direct mapping of cache organization is that
(A) It doesn't allow simultaneous access to the intended data and its tag
(B) It is more expensive than other type of organization
(C) The cache hit ratio is degraded if two more blocks used alternatively map onto the same block frame in the cache.
(D) The number of blocks required for the caches increases linearly with the size of he main memory.

99. Let A [1…. 10] be an array. Let A [i] = 2i for $1 \le i \le 10$. After the assignment j = A[A[5]] is executed, the value of A[j] is equal to
(A) Undefined (B) 1 (C) 5 (D) 10

100. The first instruction of bootstrap loader program of an operating system is stored in
(A) RAM (B) BIOS (C) Hard Disk (D) None of the above

101. The function AB'C + A'BC + ABC' + A'B'C + AB'C' is equivalent to
(A) AC' + AB + A'C (B) AB' + ABC' + A'C
(C) A'B + AC' + AB' (D) A'B + AC + AB'

102. The addition of 4 bit, 2's compliment binary numbers 1101 and 0100 results in
(A) 0001 and an overflow (B) 1001 and no overflow
(C) 001 and no overflow (D) 1001 and an overflow

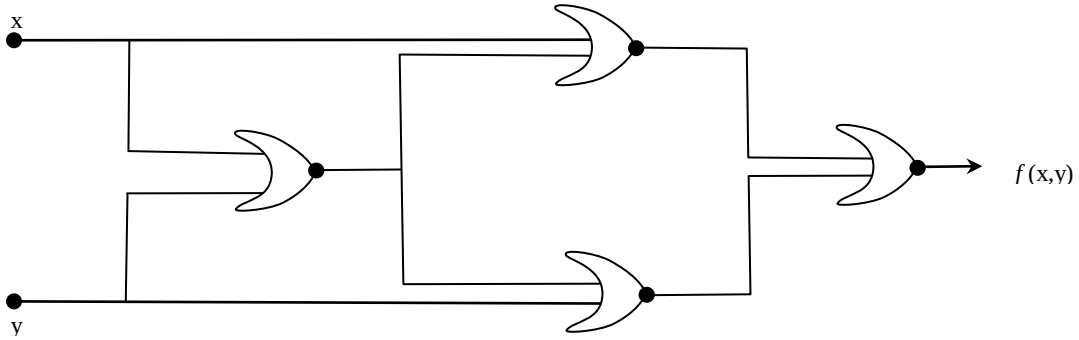
103. Given, $\sqrt{(224)_r} = (13)_r$, the value of radix r is

(A) 10 (B) 8 (C) 6 (D) 5

104. Let A=11111010 and B =00001010 be two 8 bit 2's complement numbers. Their product in 2's complement is

(A) 11000100 (B) 10011100 (C) 10100101 (D) 11010101

105. Identify the logic function performed by the circuit



(A) Exclusive OR (B) Exclusive NOR (C) NAND (D) NOR

GENERAL ENGLISH

106. Choose the most appropriate meaning for the following idiom:
'To fish in troubled waters'

(A) To make the situation worse
(B) To make profit when others are in trouble
(C) To create trouble for others
(D) In indulge in evil acts

107. Read the following sentence and choose one underlined word or phase that would not be appropriate in standard English.
One of the chair's legs was broken and the upholstery needed mending

(A) the (B) chair's (C) legs (D) needed

Directions for questions 108 and 109

Each sentence given in the questions has two blanks, each blank indicating that something has been omitted. Beneath the sentence are four sets of words. Choose the set of words for each blank that best fits the meaning of the sentence as whole.

108. Greek philosophers tried to _____ contemporary notions of change and stability by postulating the existence of the atom, _____ particle from which all varieties of matter are formed.

(A) confirm …… an interesting (B) reconcile ……. an indivisible
(B) simplify ……. a specific (D) eliminate ……. an infinitesimal

109. The Tata Group will need all itsis considerable management _____ and _____ to manage tough challenges ahead after taking over Corus Steel.

(A) skills …… interests (B) knowledge …… manpower
(B) acumen …… onus (C) experience ……. Brand equity

Directions for questions 110 and 111

In each of the following questions, a related pair of words or phrases is followed by four pairs of words or phrases. Select the pair that best expresses a relationship similar to that expressed in the original pair.

110. INFLAMMABLE : IGNITED : : _____: _____

(A) fragile: shattered (B) flexible : broken
(C) famous: plagiarized (D) somber: mourned

111. SAVANT : OBTUSE
(A) Seer : Ominous (B) Writer : Verbose
(C) Judge : Melodramatic (D) Athlete: Sluggish

Directions for questions 112 and 113:
Each question consists of a word printed in capital letters, followed by four words or phrases. Choose the word or phrase that is most nearly opposite in meaning to the word in capital letters:

112. OPPROBRIUM
(A) honour (B) prudence (C) ostentation (D) umbrage

113. INCESSANT
(A) Perpetual (B) Persistent (C) Sporadic (D) unrelenting

Directions for questions 114 and 115:
Each question consists of a word printed in capital letters, followed by four words or phrases. Choose the word or phrase that is most similar in meaning to the word in capital letters:

114. EXASPERATE
(A) Pacify (B) Mollify (C) Irritate (D) Placate

115. INIMICAL
(A) Antagonistic (B) Anonymous (C) Fanciful (D) Accurate

Directions for questions 116 to 118:
Read the following passage and answer the questions, based on what is stated or implied in the passage: Declassification of government documents has shed new light on the events comprising the Cuban Missile Crisis of October 1962. Prior to the accessibility of these records, the only source of account of the Crisis for scholars and historians were the personal memoirs and narratives of the officials who served under Kennedy and Krushchev during this period. Many of declassified documents are transcriptions and notes of meetings between members of the CIA and President Kennedy's Cabinet, as well as the President himself. The revelations in these documents have demonstrated the inadvertent inaccuracies and intended obscurities inherent in the first-person narratives of the Crisis, and has aided historians from all three countries involved in the Crisis to get a more authentic representation of what truly transpired, and for what reasons. Of perhaps the most interest to historians are declassified correspondence between John F. Kennedy and Nikita Krushchev that challenge the idea that the height of the Crisis extended only over the course of thirteen days. Indeed, these letters indicate that the Crisis was far from resolved by Khrushchev's October 28 decision to withdraw the Soviet Missiles from Cuba; instead it endured far into the following month, while slept fitfully under the illusion of peace.

116. The Author is mainly concerned with
(A) Petitioning the government to make all classified documents of historic interest accessible to the general public.
(B) Discounting the sense of danger many Americans felt during the Cuban Missile Crisis
(C) Revealing a calculated deception perpetrated by members of Kennedy's Cabinet.
(D) Illustrating how previously accepted ideas based on hearsay are being refuted by concrete evidence.

117. According to the passage, which of the following statements (s) is/are true of the Cubian Missile Crisis?
I. The Crisis is still shrouded in mystery
II. The memoirs of those closely involved in the Crisis were not entirely factual
III. The crisis spanned thirteen days
(A) I only (B) II only (C) III only (D) II and III only

118. The author's use of the phrase "inadvertent inaccuracies and intended obscurities" suggests all of the following EXCEPT
(A) historical record is often skewed by human perception
(B) details of the Crisis were purposely omitted or vague
(C) every politician deals in deception and prevarication
(D) memory is incapable of recapturing the full details of an event

Directions for question 119 and 120:
In each of the following questions, a sentence is given with a blank followed by four alternatives. Choose the word or phrase that most correctly completes the sentences.

119. Mary did not attend office yesterday. She _____ for a picnic.
(A) will have gone (B) have gone (C) may have gone (D) would go

120. I don't know where Maya is. She _____ at home.
(A) would be (B) is (C) can be (D) could be

ANSWER KEY

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