MSc MATHEMATICS

MCQ (FOR PRIVATE EXAMS)

SEM IV- ME800403 COMBINATORICS

1. ---- deals with different arrangement of objects from a given set taken one or more at a time
   (a) Permutation
   (b) Combination
   (c) Both A and B
   (d) Neither A nor B
2. P_0^n=
   (a) n
   (b) 0
   (c) 1
   (d) None of the above

3. Eight students should be accommodated in two 3-bed rooms and one 2-bed rooms. In how many ways can they be accommodated?
   (a) 175
   (b) 120
   (c) 560
   (d) 240

4. In how many ways can 3 men and 3 women sit around a table in the condition that no two women sit together?
   (a) 12
   (b) 19
   (c) 7
   (d) 10

5. 20 persons are in a meeting. The number of ways in which they and the speaker can be seated at a circular table, if persons to sit at either side of the speaker are kept fixed?
   (a) 18!
   (b) $2 \times 18!$
   (c) $3 \times 17!$
   (d) 17!

6. Find the number of possible ways to select 2balls from 5 similar balls.
(a) 2
(b) 5
(c) 6
(d) 1

7. Consider {1,2,3,4,5} If repetitions are allowed, how many 3 digit odd numbers can be made?
(a) 65
(b) 75
(c) 120
(d) 80

8. Find the number of ways in which 8 girls can be seated in a line
(a) 40320
(b) 5040
(c) 20160
(d) 2^8

9. Find the number of squares that can be made from a chess board.
(a) 64
(b) 128
(c) 240
(d) 204

10. How many handshakes will happen if 30 people handshake one another?
(a) 435
(b) 900
(c) 60
(d) 450

11. In a bag there are 3 red boxes, a blue box and 2 white boxes. In how many ways can you arrange the balls so that all the balls of same colour come together?
(a) 916
(b) 1256
(c) 428
(d) 1728

12. Find the number of ways in which 10 digit numbers can be written simply using digits 1 and 2?
(a) 10^2
(b) $10^1 \times 10^2$
(c) 2^{10}
(d) 3^{10}

13. There are 5 strawberries, 4 apples, 3 oranges and 1 each of 3 other varieties of fruits. The number of ways of selecting one fruit of each kind is:
(a) 60
(b) 24
(c) 30
(d) 120

14. How many ways are there to pack six copies of the same book into four identical boxes, where a box can contain as many as six books ?
(a) 6
(b) 10
(c) 9
(d) 11

15. In how many ways can be 10 examination papers be arranged so that the best and the worst paper never come together?
(a) $2!\,8!$
(b) $9 \times 8!$
(c) $10! - 2!$
(d) $8 \times 9!$

16. The number of ways to arrange n objects in a circular manner is given by
(a) $(n+1)!$
(b) $(n-1)!$
(c) $n!$
(d) $(n/2)!$

17. In how many ways, the letters off the word BIHAR can be rearranged?
(a) 103
(b) 67
(c) 119
(d) 72

18. $C_r^n + C_r^n + 1 = \; C_x^{n+1}$. Then $x =$
(a) $r + 1$
(b) C_r^n
(c) $r!$
(d) $(r+1)!$

19. The total number of 4 digit numbers in which all digits are distinct is
(a) 4563
(b) 4536
(c) 4532
(d) 3645

20. If $P_r^n = 3024$ and $C_r^n + 126$ $^nP_r = 3024$ and $^nC_r = 126$ then find r
(a) 25
(b) 24
(c) 35
(d) 34

21. There are 12 students in a party. Five of them are girls. In how many ways they can be seated if all the five girls sit together
(a) $7!\,5!$
(b) $12! - 5$
(c) $8!\,5!$
(d) $11!$

22. What is the number of permutations of the five set {a,a,a,b,c}
   (a) 24
   (b) 30
   (c) 25
   (d) 20

23. If 7 points out of 12 are in the same straight line then the number of triangles formed is
   (a) 185
   (b) 135
   (c) 195
   (d) 125

24. If a polygon has 170 diagonal, how many sides will it have?
   (a) 9
   (b) 10
   (c) 20
   (d) 14

25. How many 3 letter words can be formed from {a b,c,d,e,f} such that each word should contain atleast one vowel
   (a) 96
   (b) 64
   (c) 90
   (d) 76

26. How many telephone connections can be allotted with 4 and 7 digits using digits 1-9?
   (a) $9^4 + 9^7$
   (b) $9^4 + 9^7$
   (c) 4! + 7!
   (d) 28

27. 3 persons sit in a room with 8 vacant seats. They can seat themselves in ------ways
   (a) 24
   (b) 332
   (c) 8! + 7!+ 6!
   (d) 336

28. $\frac{(n+1)!}{(n-2)!}$ = -------
   (a) n^3- n
   (b) n^3+ n
   (c) n^2- n
   (d) n^3

29. Number of 4 digit numbers greater than 7000 that can be formed from {3.5.7.8.9} without digit repetition is

(a) 3 X $4C_3$

(b) 5 X 4

(c) 3 X $4P_3$

(d) 12

30. Number of permutations of the word MALAYALAM is

(a) $\frac{9!}{4!+2!+2!}$

(b) $\frac{9!}{4! X 2! X 2!}$

(c) 9! - 4! X 2! X 2!

(d) 9! – (4! +2! +2!)

31. The value of the Ramsey Number, R(3,3) is

(a) 4

(b) 6

(c) 7

(d) 9

32. The value of the Ramsey Number, R(3,5) is

(a) 4

(b) 6

(c) 14

(d) 9

33. The value of the Ramsey Number, R(3,7) is

(a) 4
(b) 6
(c) 14
(d) 23

34. The value of the Ramsey Number, R(4,4) is

(a) 18
(b) 6
(c) 14
(d) 9

35. The value of the Ramsey Number, R(3,9) is

(a) 4
(b) 36
(c) 14
(d) 9

36. The value of the Ramsey Number, R(3,8) is
(a) 4
(b) 36
(c) 28
(d) 9

37. If R(3,5)=23 and R(4, 4)=18 , then R(4,5) is less than
(a) 34
(b) 36
(c) 28
(d) 42

38. $R(m,n) \leq R(m-1,n) + \_\_\_\_\_$
(a) $R(m,n-1)$
(b) $R(m-1,n-1)$
(c) $R(n-1,n-1)$
(d) $R(m,n)$

39. $\_\_\_\_\_\_\_ \leq R(m-1,n) + R(m,n-1)$
(a) $R(m,n-1)$
(b) $R(m,n)$
(c) $R(n-1,n-1)$
(d) $R(m+1,n+1)$

40. $R(m,n) \leq R(m,n-1) + \_\_\_\_\_$
(a) $R(m-1,n)$
(b) $R(m-1,n-1)$
(c) $R(n-1,n-1)$
(d) $R(m,n)$

41. Which of the following statement is the pigeon hole principle?
I: When kn+1 objects are put among n boxes, one box will contain k+1 objects
II: When kn objects are put among n boxes, one box will contain k+1 objects

(a) Both I and II

(b) Not I but II

(c) I but not II

(d) None of I and II

42. Which of the following statement is NOT the pigeon hole principle?
(a) When kn objects are put among n boxes, one box will contain k+1 objects
(b) When kn objects are put among n boxes, at most box will contain k+1 objects
(c) When kn+2k objects are put among n+1 boxes, one box will contain k+1 objects
(d) When kn+1 objects are put among n boxes, at least one box will contain k+1 objects

43. Which of the following statement is the pigeon hole principle?
(a) When n objects are put among n boxes, one box will contain 2 objects
(b) When n objects are put among n+1 boxes, one box will contain 2 objects
(c) When n+1 objects are put among n boxes, one box will contain 2 objects
(d) When n objects are put among n boxes, one box will contain 2 objects

44. Which of the following statement is NOT the pigeon hole principle?
   (a) When 2n objects are put among n boxes, one box will contain 3 objects
   (b) When 2n objects are put among n boxes, at least one box will contain 3 objects
   (c) When 2n objects are put among n boxes, at most one box will contain 3 objects
   (d) When 2n objects are put among n boxes, no box will contain 3 objects

45. Which of the following statement is the pigeon hole principle?
   (a) When kn objects are put among n boxes, one box will contain k+1 objects
   (b) When kn objects are put among n boxes, at least one box will contain k+1 objects
   (c) When kn objects are put among n boxes, at most one box will contain k+1 objects
   (d) When kn objects are put among n boxes, no box will contain k+1 objects

46. The minimum number of persons in a party to ensure that there are 3 mutual strangers is
   (a) 3
   (b) 6
   (c) 9
   (d) 12

47. In any group of 7 persons, who are males or females,
   (a) At least 3 are males
   (b) At most 4 are males
   (c) At most 3 are females
   (d) At least 3 are females

48. In a group of 3000 people, the number of people with the same birth day is
   (a) 1500
   (b) At least 1500
   (c) At least 9
   (d) At most 7

49. Which of the following is true for a set of 10 points chosen within a square of side 3?
   (a) There are 2 points at a distant at most $\sqrt{2}$
   (b) There are 3 points at a distant at most $\sqrt{3}$
   (c) There are 3 points at a distant at least $\sqrt{2}$
   (d) There are 4 points at a distant at most $\sqrt{2}$

50. Ramsey number $R(m, n)$ exists for
   (a) For all integers m, n
   (b) For all positive integers m, n
   (c) For all integers m, n greater than 1
   (d) For all positive integers m, n greater than 2

51. Let $F(n, m); n, m \in N$, denote the number of surjective mappings from N_n to N_m. Then $F(n, m)=$ ---
   .
   (a) $F(n,m) = \sum_{k=0}^{m}(-1)^k\binom{m}{k}(m-k)^n$
   (b) $F(n,m) = \sum_{k=0}^{m}(-1)^k\binom{m}{k}m^n$
   (c) $F(n,m) = \sum_{k=0}^{m}(-1)^k\binom{m}{k}(m-k)^{n+1}$
   (d) $F(n,m) = \sum_{k=0}^{m}\binom{m}{k}(m-k)^n$

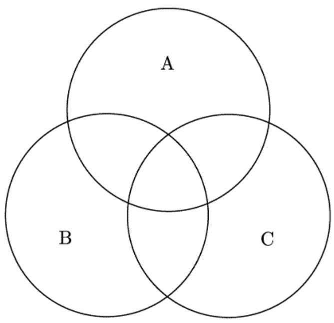
52. Let $n, m \in N$, if $n < m$, then $S(n, m) =$ ------------ .
   (a) 0
   (b) 1
   (c) -1
   (d) None of these

53. A permutation $a_1, a_2, \dots, a_n$ of N_n such that $a_i \neq i$, for each $i = 1,2,\dots,n$ is called -----
(a) Combination
(b) Derangement
(c) Convolution
(d) Rearrangement

54. Which of the following is the correct representation of $|A \cup B|$ by Principle of Inclusion and Exclusion, if $A \cap B = \emptyset$?
(a) $|A \cup B| = |A| + |B|$
(b) $|A \cup B| = |A|.|B|$
(c) $|A \cup B| = |A| - |B|$
(d) $|A \cup B| = |A| + |B| + |A \cap B|$

55. Which of the following is the correct representation of $|A \cup B|$ by Principle of Inclusion and Exclusion, if $A \cap B \neq \emptyset$?
(a) $|A \cup B| = |A| + |B| + |A \cap B|$
(b) $|A \cup B| = |A| + |B| - |A \cap B|$
(c) $|A \cup B| = |A| + |B| + |A \times B|$
(d) $|A \cup B| = |A| + |B| - |A - B|$

56. With reference to the Venn- diagram, what is the formula for computing $|A \cup B \cup C|$?



(a) $|A \cup B \cup C| = |A| + |B| + |C| - |A \cap B| - |A \cap C| - |B \cap C| + |A \cap B \cap C|$
(b) $|A \cup B \cup C| = |A| + |B| + |C| + |A \cap B| + |A \cap C| + |B \cap C| + |A \cap B \cap C|$
(c) $|A \cup B \cup C| = |A| + |B| + |C| - |A \cap B| - |A \cap C| - |B \cap C|$
(d) $|A \cup B \cup C| = |A| + |B| + |C| - |A \cup B| - |A \cup C| - |B \cup C| + |A \cap B \cap C|$

57. Let $A = \{2,3,4\}, B = \{5,9,2,7\}, C = \{4\}$. Find $|A \cup B \cup C|$?
(a) 1
(b) 4
(c) 3
(d) 6

58. If $n \in N$, find the value of S(n, n)?
(a) 0
(b) 1
(c) -1
(d) n

59. If $n \in N$, find the value of S(n, n-1)?
(a) 0
(b) 1
(c) $\binom{n}{2}$
(d) $\binom{n}{3} + 1$

60. If $n \in N$, find the value of S(n, n-2)?

(a) $\binom{n}{3} + 3\binom{n}{4}$
(b) $\binom{n}{1}$
(c) 0
(d) 1

61. For any $n, m \in N$, what is the relation between $S(n,m)$ and $F(n,m)$?

(a) $(S(n,m) = n!\, F(n,m)$
(b) $S(n,m) = m!\, F(n,m)$
(c) $S(n,m) = \frac{1}{m!}\, F(n,m)$
(d) $S(n,m) = m\, F(n,m)$

62. For $n, r, k \in N$, such that $n \geq r \geq k \geq 0$ and $r \geq 1$, then $D(n,r,k) =$ ________

(a) $D(n,r,k) = \binom{r}{k} \sum_{i=0}^{r-k} (-1)^i \binom{r-k}{i} (n-k-i)!$
(b) $D(n,r,k) = \frac{\binom{r}{k}}{(n-r)!} \sum_{i=0}^{r-k} (-1)^i \binom{r-k}{i} (n-k-i)!$
(c) $D(n,r,k) = \frac{\binom{r}{k}}{(n-r)!} \sum_{i=0}^{r-k} \binom{r-k}{i} (n-k-i)!$
(d) $D(n,r,k) = \sum_{i=0}^{r-k} (-1)^i \binom{r-k}{i} (n-k-i)!$

63. $\lim_{n \to \propto} \frac{D_n}{n!}$ =---------

(a) e
(b) 1
(c) e^{-1}
(d) 0

64. For any $n \in N$, D_n = ---------

(a) $D_n = \left[1 - \frac{1}{1!} + \frac{1}{2!} - \frac{1}{3!} \ldots \frac{(-1)^n}{n!}\right]$
(b) $D_n = n!\,[1 - 1! + 2! - 3! \ldots (-1)^n n!]$
(c) $D_n = \frac{1}{n!}\left[1 - \frac{1}{1!} + \frac{1}{2!} - \frac{1}{3!} \ldots \frac{(-1)^n}{n!}\right]$
(d) $D_n = n!\left[1 - \frac{1}{1!} + \frac{1}{2!} - \frac{1}{3!} \ldots \frac{(-1)^n}{n!}\right]$

65. Let $S = \{1,2, \ldots 500\}$. Find the number of integers in S which are divisible by 2,3 or 5.

(a) 300
(b) 324
(c) 366
(d) 425

66. Let $A = \{1,2,3,4,5\}$ and $B = \{2,4,6,8,10,12\}$. Find $|A \cup B|$.

(a) 5
(b) 9
(c) 10
(d) 7

67. Which of the following represents the correct formula for $|A \cup B \cup C|$, if A, B, C are disjoint sets?

(a) $|A \cup B \cup C| = |A| + |B| + |C|$
(b) $|A \cup B \cup C| = |A| + |B| + |C| - |A \cup B| - |A \cup C| - |B \cup C| + |A \cap B \cap C|$
(c) $|A \cup B \cup C| = 2[|A| + |B| + |C|]$
(d) $|A \cup B \cup C| = |A|.|B|.|C|$

68. Which principle states that "For any q finite sets $A_1, A_2, \ldots A_q, q \geq 2$,

$$\left|A_1 \cup A_2 \cup \dots A_q\right| = \sum_{i=1}^{q} |A_i| - \sum_{i<j} \left|A_i \cap A_j\right| + \sum_{i<j<k} \left|A_i \cap A_j \cap A_k\right| - \dots + (-1)^{q+1} \left|A_1 \cap A_2 \cap \dots A_q\right|"$$

(a) Pigeon hole principle
(b) Principle of injection and surjection
(c) Principle of inclusion and exclusion
(d) None of these

69. Find the value of $D(4,3,3)$?
(a) 0
(b) 1
(c) 2
(d) 3

70. Find the value of $D(4,3,2)$?
(a) 2
(b) 1
(c) -1
(d) 3

71. Find the value of $D(4,3,0)$?
(a) 9
(b) 10
(c) 11
(d) 2

72. For $1 \leq m \leq q$, let $w(P_{i_1}, P_{i_2}, \dots P_{i_m})$ denote the number of elements of, an n-element universal set, S that posses the properties $P_{i_1}, P_{i_2}, \dots P_{i_m}$ and let $w(m) = \sum w(P_{i_1}, P_{i_2}, \dots P_{i_m})$, where the summation is taken over all m-combinations $(i_1, i_2, \dots i_m)$ of $\{1,2, \dots q\}$, then $w(0) =$ ---------
(a) 0
(b) 1
(c) n
(d) $\binom{n}{q}$

73. Let A={2,6,7,11,19,21,31,32,34} and B={0,1,3,8,13,17}. Find $|A \cup B|$.
(a) 14
(b) 13
(c) 15
(d) 16

74. Let $|A| = 36, |B| = 24, |C| = 12$ and $A \cap B = A \cap C = B \cap C = A \cap B \cap C = \emptyset$. Find $|A \cup B \cup C|$?
(a) 50
(b) 24
(c) 72
(d) 12

75. For $n, m \in N, \sum_{k=0}^{n}(-1)^k \binom{n}{k}(n-k)^n =$ -------------
(a) 0
(b) $n!$
(c) $(n-1)!$
(d) $\binom{n}{2}$

76. What is the generating function of the sequence $\binom{n}{0}, \binom{n}{1}, \dots, \binom{n}{n}, 0, 0, 0, \dots$

(a) $(1+x)^n$

(b) $(1-x)^2$

(c) $(1-x)^{-2}$

(d) $(1+x)^{-n}$

77. If the recurrence relation of the Tower of Hanoi problem with n discs is $a_n = 2a_{n-1} + 1$, where a_1=1, then what is the value of a_6.

(a) 127

(b) 63

(c) 31

(d) 32

78. Let A(x) be the generating function for the sequence (a_r). What is the generating function for the sequence (c_r), where c_r= $a_0 + a_1 + a_2 + \cdots + a_r$, for all r.

(a) A'(x)

(b) x A'(x)

(c) $\frac{A(x)}{1-x}$

(d) (1-x) A(x)

79. What is the coefficient of x^{22} in the expansion $(x^3 + x^4 + x^5 + \cdots)^6$

(a) 125

(b) 126

(c) 127

(d) 128

80. The number of partitions of r into distinct parts is

(a) Equal to the number of partitions of r into even parts

(b) Equal to the number of partitions of r into odd parts

(c) Greater than the number of partitions of r into even parts

(d) Greater than the number of partitions of r into even parts

81. What is the generating function of the sequence (1, 2, 3, ….)

(a) $(1+x)^n$

(b) $(1-x)^2$

(c) $(1-x)^{-2}$

(d) $(1+x)^{-n}$

82. Let a_r be the number of ways of distributing r identical objects into n distinct boxes. What is the generating function for (a_r).

(a) $(1-x)^n$

(b) $(1+x)^2$

(c) $(1+x)^{-2}$

(d) $(1-x)^{-n}$

83. What is the solution of the recurrence relation $a_n = 2a_{n-1} + 1$, where $a_1 = 1$.

(a) $a_n = 2^n - 1$

(b) $a_n = 2^{2n} - 1$

(c) $a_n = 2^{-n} + 1$

(d) $a_n = 2^{-n} + 1$

84. Let A(x) be the generating function for the sequence (a_r). What is the generating function for the sequence (c_r), where $c_0 = a_0,\ c_r = a_r - a_{r-1}$, for all r ≥ 1.

(a) A'(x)

(b) x A'(x)

(c) $\frac{A(x)}{1-x}$

(d) (1-x) A(x)

85. What is the generating function of the sequence $1, k, k^2$, ..., where k is an arbitrary constant.

(a) $(1-kx)^{-1}$

(b) $(1+kx)^2$

(c) $(1-kx)^{-2}$

(d) $(1-kx)^n$

86. The transpose of the Ferrers diagram Ƒ is

(a) A Ferrers diagram whose rows are the columns of Ƒ

(b) Not a Ferrers diagram

(c) A Ferrers diagram whose rows and columns are same as Ƒ

(d) A Ferrers diagram whose number of rows and columns are equal

87. What is the exponential generating function for $(0!, 1!, 2!, \dots, r!, \dots)$

(a) $\sum_{r=0}^{\infty} r! \frac{x^r}{r!}$

(b) $\sum_{r=0}^{\infty} \frac{x^r}{r!}$

(c) $\sum_{r=0}^{\infty} r! \frac{(kx)^r}{r!}$

(d) $\sum_{r=0}^{\infty} (kr)! \frac{x^r}{r!}$

88. Let A(x) be the generating function for the sequence (a_r). What is the generating function for the sequence (c_r), where $c_r = ra_r$, for all r .

(a) A'(x)

(b) x A'(x)

(c) $\frac{A(x)}{1-x}$

(d) $\int_0^x A(t)$

89. Let P be the partition of the number 12 as P: 11 = 5+4+2. What is the partition we will obtain using Ferrers diagram.

(a) 11 = 5+2+2

(b) 11 = 5+1+1+1+1

(c) 11 = 5+2+1+1

(d) 11 = 3+3+2+2+1

90. Number of distinct partitions of 5 is

(a) 5

(b) 6

(c) 7

(d) 8

91. What is the generating function for the sequence b_r, where b_r denote the number of partitions of r into odd parts.

(a) $\frac{1}{(1-x)(1-x^2)(1-x^3)\ldots.}$

(b) $\frac{1}{(1-x^2)(1-x^4)(1-x^6)\ldots.}$

(c) $\frac{1}{(1-x)(1-x^3)(1-x^5)\ldots.}$

(d) $\frac{1}{(1-x)(1-x)^2(1-x)^3\ldots.}$

92. What is the coefficient of x^{20} in the expansion $(x^3 + x^4 + x^5 + \cdots)^3$

(a) 76

(b) 78

(c) 77

(d) 80

93. In how many ways the letters of the word ROOT can be arranged?

(a) 5

(b) 6

(c) 7

(d) 8

94. Let A(x) be the generating function for the sequence (a_r). What is the generating function for the sequence (c_r), where c_r=$k^r a_r$, for all r and k is a constant.

(a) $\int_0^x A(t)$

(b) A'(kx)

(c) $\frac{A(x)}{1-x}$

(d) A(kx)

95. Let k, n ∈ N and k≤ n. Then the number of partitions of n into k parts is

(a) Equal to the number of partitions of n into parts the largest size of which is k

(b) Equal to the number of partitions of n into parts the smallest size of which is k

(c) Greater than the number of partitions of n into parts the largest size of which is k

(d) Greater than the number of partitions of n into parts the smallest size of which is k

96. What is the solution of the recurrence relation $a_n = a_{n-1} + 3\binom{n+2}{3}$, where for n ≥ 1

(a) $3\binom{n+2}{3}$

(b) $3\binom{n+3}{4}$

(c) $3\binom{n+1}{5}$

(d) $3\binom{n-2}{3}$

97. What is the generating function of the sequence $\left(\binom{n-1}{0}, \binom{1+n-1}{1}, \ldots, \binom{r+n-1}{r}, \ldots\right)$

(a) $(1+x)^n$

(b) $(1-x)^n$

(c) $(1-x)^{-n}$

(d) $(1+x)^{-n}$

98. Let P be the partition of the number 12 as P: 12 = 4+3+3+2. What is the partition we will obtain using Ferrers diagram.

(a) 12 = 4+4+2+1+1

(b) 12 = 4+4+3+1

(c) 12 = 4+4+2+2

(d) 12 = 4+4+1+1+1+1

99. Let A(x) be the generating function for the sequence (a_r). What is the generating function for the sequence (c_r), where $c_0 = 0,\ c_r = \frac{a_{r-1}}{r}$, for all r ≥ 1.

(a) $\int_0^x A(t)$

(b) x A'(x)

(c) $\frac{A(x)}{1-x}$

(d) (1-x) A(x)

100. A partition of n is equivalent to

(a) Distributing n identical objects into n different boxes

(b) Distributing n different objects into n different boxes

(c) Distributing n identical objects into n identical boxes

(d) Distributing n different objects into n identical boxes

MSc MATHEMATICS

ANSWER KEY FOR MCQ (FOR PRIVATE EXAMS)

SEM IV- ME800403 COMBINATORICS

1. (a)
2. (c)
3. (c)
4. (a)
5. (b)
6. (d)
7. (b)
8. (a)
9. (d)
10. (a)
11. (d)
12. (c)
13. (a)
14. (c)
15. (d)
16. (b)
17. (c)
18. (a)
19. (b)
20. (a)
21. (c)
22. (d)
23. (a)
24. (c)
25. (a)
26. (a)
27. (d)
28. (a)
29. (c)
30. (b)
31. (b)
32. (c)
33. (d)
34. (a)

35.(b)

36.(c)

37.(d)

38.(a)

39.(b)

40.(a)

41.(c)

42.(a)

43.(c)

44.(c)

45.(b)

46.(b)

47.(c)

48.(c)

49.(a)

50.(c)

51.(a)
52.(a)
53.(b)
54.(a)
55.(b)
56.(a)
57.(d)
58.(b)
59.(c)
60.(a)
61.(c)
62.(b)
63.(c)
64.(d)
65.(c)
66.(b)
67.(a)
68.(c)

69.(b)
70.(d)
71.(c)
72.(c)
73.(c)
74.(c)
75.(b)
76.(a)
77.(b)
78.(c)
79.(b)
80.(b)
81.(c)
82.(d)
83.(a)
84.(d)
85.(a)
86.(a)
87.(a)
88.(b)
89.(d)
90.(c)
91.(c)
92.(b)
93.(b)
94.(d)
95.(a)
96.(b)
97.(c)
98.(b)
99.(a)
100.(c)