PREVIOUS YEAR PAPER

SSC CGL 2017 Tier II — Quantitative Abilities — 9 March 2018

SSC CGL · 9 March 2018 · 10:30 AM - 12:30 PM

87 of the paper's 100 questions · marks per question not printed on the response sheet · 120 minutes

Left out of the original paper: 13 (any question that needs a figure or formatting we cannot show, has no answer in the response sheet, or could not be checked against a second copy of the paper).

Questions from the Staff Selection Commission's paper of 9 March 2018, 10:30 AM - 12:30 PM. Each question is followed by its answer, and the answer key is repeated on the last page.

Take it as a timed practice test: exambharo.com/ssc-cgl/previous-year-papers/ssc-cgl-2017-tier-2-quant-9-mar/

Quantitative Abilities

1. How many two digit prime numbers are there between 10 to 100 which remains prime numbers when the order of their digits is reversed?

(a) 8
(b) 9
(c) 10
(d) 12

Answer: (b)

2. How many perfect cubes are there between 1 and 10000 which are divisible by 7?

(a) 5
(b) 6
(c) 7
(d) 15

Answer: (b)

3. If A = 0.142857142857..... and B = 0.16666 ....., then what is the value of (A + B)/AB?

(a) 10
(b) 11
(c) 12
(d) 13

Answer: (d)

4. If A = 0.abcabc ....., then by what number A should be multiplied so as to get an integeral value?

(a) 2997
(b) 1000
(c) 1998
(d) Both 2997 and 1998

Answer: (d)

6. If (1/21) + (1/22) + (1/23) ..... (1/210) = 1/k, then what is the value of k?

(a) 512/511

(b) 1024/1023

(c) 511/512

(d) 1023/1024

Answer: (b)

8. Which of the following statement(s) is/are TRUE? I. Highest common factor of (32002 – 1) and (32002 + 1) is 4 II. (484 – 1) is exactly divisible by 5

(a) Only I

(b) Only II

(c) Neither I nor II

(d) Both I and II

Answer: (b)

9. Which of the following statement(s) is/are TRUE? I. 199 + 299 + 399 + 499 + 599 is exactly divisible by 5. II. 3111 > 1714

(a) Only I

(b) Only II

(c) Neither I nor II

(d) Both I and II

Answer: (a)

10. N = 248 – 1 and N are exactly divisible by two numbers between 60 and 70. What is the sum of those two numbers?

(a) 128

(b) 256

(c) 64

(d) 512

Answer: (a)

12. Which of the following statement(s) is/are TRUE? I. √1 + √2 + √3 + √4 + √5 + √6 > 10 II. √(10) + √(12) + √(14) > 3√(12)

(a) Only I

(b) Only II

(c) Neither I nor II

(d) Both I and II

Answer: (a)

13. If y2 = y + 7, then what is the value of y3?

(a) 8 y + 7

(b) y + 14

(c) y + 2

(d) 4 y + 7

Answer: (a)

14. If f(x) = (x – 2)(x2 + Px + 4) and (x – 3) is a factor of f(x), then what is the value of P?
    (a) 4
    (b) – 4
    (c) – 13/3
    (d) 13/3
    Answer: (c)

15. If [x – (1/x)] = 2, then what is the value of [x6 – (1/x6)]?
    (a) 114√3 + 1
    (b) 134√2
    (c) 142√2 + 3
    (d) 140√2
    Answer: (d)

16. x, y and z all are positive number. If 3x > 9y and 2y > 4z, then which of the following is TRUE?
    (a) x > y > z
    (b) x > z > y
    (c) z > y > x
    (d) y > x > z
    Answer: (a)

17. If x = (1/8), which of the following has the largest v es?
    (a) x/2
    (b) x2
    (c) √x
    (d) 1/ x
    Answer: (d)

19. If P = 229 × 321 × 58, Q = 227 × 321 × 58, R = 226 × 322 × 58 and S = 225 × 322 × 59, then which of the following is TRUE?
    (a) P > S > R > Q
    (b) S > P > R > Q
    (c) P > R > S > Q
    (d) S > P > Q > R
    Answer: (a)

20. If A = 125 and B = 8, then what is the value of (A + B)3 – (A – B)3 – 6B(A2 – B2)?
    (a) 4096
    (b) 4608
    (c) 4224
    (d) 3456
    Answer: (a)

23. If sides of a triangle are 12 cm, 15 cm and 21 cm, then what is the inradius (in cm) of the triangle?

(a) $(5\sqrt{3})/2$

(b) $4\sqrt{3}$

(c) $(3\sqrt{6})/2$

(d) $3\sqrt{3}$

Answer: (c)

24. In a triangle ABC, AB = 12, BC = 18 and AC = 15. The medians AX and BY intersect sides BC and AC at X and Y respectively. If AX and BX intersect each other at O, then what is the value of OX?

(a) $4\sqrt{23}$

(b) $\sqrt{23}$

(c) $2\sqrt{23}$

(d) $(\sqrt{23})/(\sqrt{2})$

Answer: (d)

25. In a triangle PQR, PX bisects QR. PX is the angle bisector of angle P. If PQ = 12 cm and QX = 3 cm, then what is the area (in cm2) of triangle PQR?

(a) $12\sqrt{3}$

(b) $8\sqrt{15}$

(c) $18\sqrt{2}$

(d) $9\sqrt{15}$

Answer: (d)

27. PQ and RS are two chords of a circle. PQ = 20 c[illegible] RS = 48 cm and PQ is parallel to RS. If the distance between PQ and RS is 34 cm, the [illegible]hat [illegible]e area (in cm2) of the circle?

(a) 729π

(b) 900π

(c) 676π

(d) 784π

Answer: (c)

28. Centre of two concentric circles is O. The area of two circles is 616 cm2 and 154 cm2 respectively. A tangent is drawn through point A on the larger circle to the smaller circle. This tangent touches small circle at B and intersects larger circle at C. What is the length (in cm) of AC?

(a) $12\sqrt{3}$

(b) $14\sqrt{3}$

(c) $10\sqrt{6}$

(d) $18\sqrt{2}$

Answer: (b)

29. PA and PB are two tangents drawn to two circles of radius 3 cm and 5 cm respectively. PA touches the smaller and larger circles at points X and Y respectively. PB touches the smaller and large circle at point U and V respectively. The centres of the smaller and larger circles O and N respectively. If ON = 12 cm, then what is the value (in cm) of PY?

(a) $5\sqrt{35}$

(b) $7\sqrt{15}$

(c) $9\sqrt{15}$

(d) $12\sqrt{5}$

Answer: (a)

32. The distance between the centres of two circles is 24 cm. If the radius of the two circles are 4 cm and 8 cm, then what is the sum of the lengths (in cm) of the direct common tangent and the transverse common tangent?

(a) $4(3\sqrt{3} + \sqrt{35})$

(b) $4(4\sqrt{35} + 3\sqrt{3})$

(c) $4(\sqrt{35} + 3\sqrt{3})$

(d) $4\sqrt{3}(\sqrt{35} + 3\sqrt{3})$

Answer: (c)

33. ABC is triangle. AB = 10 cm and BC = 16 cm. AD = 8 cm and is perpendicular to side BC. What is the length (in cm) of side AC?

(a) $4\sqrt{41}$

(b) $2\sqrt{41}$

(c) $2\sqrt{82}$

(d) $4\sqrt{82}$

Answer: (b)

34. An equilateral triangle of side 12 cm is drawn. What is the area (in cm2) of the largest square which can be drawn inside it?

(a) $1512 – 864\sqrt{3}$

(b) $3024 – 1728\sqrt{3}$

(c) $3024 + 1728\sqrt{3}$

(d) $1512 + 864\sqrt{3}$

Answer: (b)

35. PQRS is a rectangle. The ratio of the sides PQ and QR is 3 : 1. If the length of the diagonal PR is 10 cm, then what is the area (in cm2) of the rectangle?

(a) 15

(b) 30

(c) 45

(d) 20

Answer: (b)

36. ABCDEF is a regular hexagon. What is the ratio of the area of triangle ACE and area of triangle AEF?

(a) 6 : 1

(b) 4 : 1

(c) 3 : 1

(d) 5 : 1

Answer: (c)

37. ABCD is a trapezium. Sides AB and CD are parallel to each other. AB = 6 cm, CD = 18 cm, BC = 8 cm and AD = 12 cm. A line parallel to AB divides the trapezium in two parts of equal perimeter. This line cuts BC at E and AD at F. If BE/EC = AF/FD, than what is the value of BE/EC?

(a) 1/2

(b) 2

(c) 4

(d) 1/4

Answer: (c)

38. A rectangular sheet of length 42 cm and breadth 14 cm is cut from a circular sheet. What is the minimum area (in cm2) of circular sheet?

(a) 3080

(b) 1540

(c) 770

(d) 1030

Answer: (b)

41. Four identical cones each of radius 10.5 cm and height 14 cm are cut from a cuboid of dimensions 30 cm × 32 cm × 40 cm (base of each cone lies on the surface of cuboid). What is the total surface area (in cm2) of the remaining solid?

(a) 6528

(b) 7804

(c) 5926

(d) 6824

Answer: (b)

42. A hollow cylinder of thickness 0.7 cm and height 15 cm is made of iron. If inner radius of cylinder is 3.5 cm, then what is the total surface area (in cm2) of the hollow cylinder?

(a) 812.12

(b) 768.42

(c) 759.88

(d) 828.42

Answer: (c)

43. A hollow cylinder has height 90 cm and the outer curved surface area is 11880 cm2. It can hold 55440 cm3 of air inside it. What is the thickness (in cm) of this cylinder?

(a) 10.5

(b) 14

(c) 7

(d) 3.5

Answer: (c)

44. A hollow sphere is melted to form small identicall hollow spheres. Inner and outer radius of the bigger sphere are 4 cm and 6 cm respectively. If inner and outer radii of the smaller sphere are 2 cm and 3 cm respectively, then how many smaller spheres can be formed?

(a) 4

(b) 8

(c) 6

(d) 12

Answer: (b)

45. A hemispherical dome is open from its base and is made of iron. Thickness of dome is 3.5 meter. Total cost of painting domes outer curved surface is Rs 2464. If the rate of painting is Rs 8 per meter2, then what is the volume (in meter3) of iron used in making dome?

(a) 656.42

(b) 614.21

(c) 524.46

(d) 628.83

Answer: (d)

46. A solid cuboid has dimensions 14 cm × 18 cm × 24 cm. A hemisphere of radius 3.5 cm is cut from the centre of each face of cuboid. What is the total surface area (in cm2)of the remaining solid?

(a) 1902

(b) 1809

(c) 1706

(d) 2271

Answer: (d)

47. A right pyramid with square base has side of base 12 cm and height 40 cm. It is kept on its base. It is cut into 4 parts of equal heights by 3 cuts parallel to its base. What is the ratio of volume of the four parts?

(a) 1 : 8 : 27 : 70

(b) 1 : 7 : 19 : 47

(c) 1 : 7 : 19 : 37

(d) 1 : 8 : 27 : 64

Answer: (c)

48. What is the value of 2 sin 15° cos 15° – 4 sin3 15° cos 15°?

(a) 3/√2

(b) √3/2

(c) √3/4

(d) 1/2

Answer: (c)

49. If sin x = 1/2 and sin y = 2/3, then what is the value of [(6 cos2 x – 4 cos4 x)/(18 cos2 y – 27 cos4 y)]?

(a) 27/20

(b) 15/14

(c) 25/21

(d) 17/14

Answer: (a)

50. What is the value of cos 15o + cos 105o?

(a) √3

(b) 1/√2

(c) √3/2

(d) 1/√3

Answer: (b)

51. If sin (A – B) = 1/2 and cos (A + B) = 1/2, then wh , the value of sin A cos A + sin2 A sin B cos B + cos3 A cos B tan A?

(a) 1/2

(b) 3/4

(c) 1/4

(d) 3/2

Answer: (b)

52. What is the value of cot (90 + 75o)?

(a) 2 + √3

(b) – 2 – √3

(c) √3 + 1

(d) – √3 – 1

Answer: (a)

53. If (A + B + C) = 90o, then what is the value of sin (A/2) sin [(180 – B – C)/2] + cos (A/2) sin (B + C)/2?

(a) 1/2

(b) 1

(c) 1/√2

(d) √3/2

Answer: (c)

54. What is the value of cot (90 – x) sin4 (90 – x) + cot (180 – x) sin4 (180 – x)?

(a) (cos 4x)/4

(b) (sin2 2x)/2

(c) (cos2 2x)/2

(d) (sin 4x)/4

Answer: (d)

55. A flag of height 4 metres is standing on the top of a building. The angle of elevation of the top of the flag from a point X is 45o and the angle of elevation of the top of building from X is 30o. Point X is on the ground level. What is the height (in metres) of the building?

(a) √3 + 2

(b) 2(√3 + 1)

(c) 4(√3 + 1)

(d) (√3 + 1)

Answer: (b)

56. Height of a tower is 120 metres. The angle of elevation of the top of tower from a point B is 75o. Point B is on the ground level. What is the distance (in metres) of point B from the base of tower?

(a) 120 (2 – √3)

(b) 180 (3 – √3)

(c) 180 (√3 – 1)

(d) 150 (√3 – 1)

Answer: (a)

58. Total number of bikes manufactured by company D is what percentage of total number of cars of type C1 manufacture by company G?

(a) 50

(b) 100

(c) 200

(d) 150

Answer: (c)

59. What is the average of the total number of cars of type C1 manufactured by the given 5 companies?

(a) 58000

(b) 60000

(c) 56000

(d) 62000

Answer: (d)

60. What is the difference between the total number of C3 type car manufactured by company E and G together and the number of bikes of type B1 manufactured by company H?

(a) 44000

(b) 40000

(c) 48000

(d) 42000

Answer: (b)

61. H = Total number of B2 type bike manufactured by all the companies. R = Total number of C1 type car manufactured by company F, G and D together. What is the value of H/R?

(a) 0.625

(b) 1.35

(c) 1.15

(d) None of these

Answer: (c)

62. A = Total number of cars manufactured by all the companies. K = Difference between the number of C3 type cars manufactured by company H and the number of B3 type bike manufactured by company E. What is the value of A : K?

(a) 91 : 2

(b) 93 : 2

(c) 181 : 4

(d) 185 : 4

Answer: (b)

64. In what ratio should cement costing Rs 2[illegible] bag be mixed with cement costing Rs 325 per bag so that the cost of the mixture is Rs 300 per bag. (A bag of cement is 50 kg).

(a) 1:2

(b) 2:1

(c) 3:2

(d) 2:3

Answer: (a)

65. A started a trading firm by investing Rs 10 lakhs. After 4 months, B joined the business by investing Rs 15 lakhs then 2 months after B joined C too joined them by investing Rs 20 lakhs. 1 year after A started the business they made Rs 6,00,000 in profit. What is C's share of the profit (in Rs)?

(a) 2,00,000

(b) 1,00,000

(c) 1,50,000

(d) 3,00,000

Answer: (a)

66. A and B started a partnership business investing in the ratio of 2 : 5. C joined them after 3 months with an amount equal to 4/5th of B. What was their profit (in Rs) at the end of the year if A got Rs 16,800 as his share?

(a) 56000

(b) 100800

(c) 84000

(d) 117600

Answer: (c)

67. Working alone A can do a work in 72 days and B in 90 days. If they work on it together for 10 days, then what fraction of work is left?

(a) 1/4

(b) 3/5

(c) 1/5

(d) 3/4

Answer: (d)

68. A, B and C together can build a wall in 12 days. C is four times as productive as B and A alone can build the wall in 48 days. In how many days A and B working together can build the wall?

(a) 20

(b) 30

(c) 80

(d) 40

Answer: (b)

69. Working together A and B can do a job in [illegible]s, B and C in 10 days and all three together in 9 days. In how many days can B alone do the job?

(a) 90

(b) 30

(c) 24

(d) 60

Answer: (d)

70. A can do 1/5 of a job in 10 days, B can do 1/3 rd of the job in 25 days. In how many days can they do half of the job working together?

(a) 30

(b) 45

(c) 15

(d) 20

Answer: (c)

71. 1 bar of chocolate costs Rs 80 but a box containing 6 bars of the same chocolate costs Rs 400. What is the effective discount (in %) on the box?

(a) 20

(b) 16.67

(c) 25

(d) 15

Answer: (b)

72. 15% discount is offered on a shirt marked at Rs 1200. But the shirt is sold at Rs 918 after giving a further cash discount. How much is this cash discount (in %)? 1200

(a) 10

(b) 12

(c) 5

(d) 8

Answer: (a)

73. A retailer marks up his goods by 30% and offers 15% discount. What will be the selling price (in Rs) of an item sold by the retailer if its cost to the retailer is Rs 1,000?

(a) 1050

(b) 1105

(c) 805

(d) 1225

Answer: (b)

74. The selling price of a smartphone is Rs [illegible]00 if [illegible]e discount on it is 20%. What would be the selling price (in Rs) of the smartphone if the [illegible]t on it was 25%?

(a) 10240

(b) 7680

(c) 1200

(d) 9000

Answer: (d)

75. The wages of three labourers A, B and C are in the ratio 10:12:15. A's wage is increased in the ratio 5:6, B's wage is increased in the ratio 3:4 and C's wage is increased in the ratio 3:5. The new ratio of the wages of A:B:C is _____.

(a) 15:18:20

(b) 12:16:25

(c) 6:7:9

(d) 8:6:5

Answer: (b)

76. The ratio of present ages of Ajay and Vijay is 2:3. 4 years ago the ratio of their ages was 3:5. What is Vijay's present age (in years)?

(a) 16

(b) 8

(c) 32

(d) 24

Answer: (d)

77. If 12A = 16B = 15C; find A : B : C.

(a) 12:16:15

(b) 15:16:12

(c) 20:15:16

(d) 16:15:20

Answer: (c)

78. Find the third proportional to 16 and 20.

(a) 24

(b) 25

(c) 32

(d) 40

Answer: (b)

79. Find the number of students who took an exam if the ratio of those who passed to those who failed in the exam was 10 : 3. If 40 more students had taken the exam and 10 less had failed, then the ratio of those who passed to those who failed in the exam would have been 5 : 1.

(a) 200

(b) 250

(c) 300

(d) 260

Answer: (d)

80. The ratio of the bank balance of three brothers A, B and C is 10 : 12 : 5. B transfers Rs 60,000 from his account to C's. The new ratio of the bank balances becomes 10 : 9 : 8. What is the bank balance of A (in Rs)?

(a) 100000

(b) 200000

(c) 300000

(d) 400000

Answer: (b)

81. In a set of three numbers, the average of first two numbers is 21, the average of the last two numbers is 24, and the average of the first and the last numbers is 15. What is the average of three numbers?

(a) 20

(b) 60

(c) 25

(d) 18

Answer: (a)

82. In a club there are 12 wrestlers. When a wrestler whose weight is 90 kg leaves the club, he is replaced by a new wrestler then the average weight of this 12 member club increases by 0.75 kg. What is the weight (in kg) of the new wrestler who joined the club?

(a) 108

(b) 99

(c) 112

(d) 100

Answer: (b)

83. A zoo has an average of 500 visitors on Sundays and 200 on other days. The average number of visitors per day in a month of 30 days beginning with a Sunday is:

(a) 225

(b) 275

(c) 300

(d) 250

Answer: (d)

84. The average of 35 consecutive even numbers is 44. Find the smallest number.

(a) 8

(b) 12

(c) 10

(d) 14

Answer: (c)

85. If a shopkeeper sells a mixer at Rs 11,400 then he suffers a loss of 5%. At what price (in Rs) should he sell the mixer to gain 10%?

(a) 9845

(b) 10909

(c) 13200

(d) 11913

Answer: (c)

86. A grain trader has 100 bags of rice. He sold some bags at 10% profit and rest at 20% profit. His overall profit on selling these 100 bags was 14%. How many bags did he sell at 20% profit?

(a) 40

(b) 50

(c) 60

(d) 70

Answer: (a)

87. By selling 21 pots at Rs 2,520, there is a loss equal to the cost price of 3 pots. Find the cost price (in Rs) of each pot. 2,520

(a) 140

(b) 150

(c) 160

(d) 180

Answer: (a)

88. The profit margin on a sofa set is 100%. If the cost price of the sofa set falls by 20% then what will be the new profit margin (in %)?

(a) 150

(b) 120

(c) 200

(d) 180

Answer: (a)

89. 150% of 0.05% of x is 75. Find x.

(a) 1,00,000

(b) 75000

(c) 1,25,000

(d) 1,50,000

Answer: (a)

90. A student multiplied a number by 4/5 instead of 5/4. What is the percentage error in the calculation?

(a) 16

(b) 25

(c) 36

(d) 20

Answer: (c)

91. Elections were held in a society to elect a chairman. There were only two candidates A and B. Candidate B got 25% less votes than candidate A. The number of members who did not cast the vote was same as the number of votes that candidate B got. By how many votes did A win if the society had 20,000 members.

(a) 6000
(b) 4000
(c) 8000
(d) 2000

Answer: (d)

92. 250% of a = b, then b% of 250 is the same as a% of _____.

(a) 625
(b) 1000
(c) 100
(d) 6250

Answer: (a)

93. A bullet shoots 500 m in 0.2 seconds. What is its speed in km/hr?

(a) 1000
(b) 900
(c) 100
(d) 9000

Answer: (d)

94. A taxi goes from City A to City B at an average speed of 84 km/hr. In the return journey due to traffic the average speed of the taxi falls by 2[illegible]. Find the average speed of the taxi (in km/hr) for the total journey.

(a) 72
(b) 75
(c) 70
(d) 68

Answer: (c)

95. A jogger covered a certain distance at some speed. Had he moved 3 km/hr faster, he would have taken 20 minutes less. If he had moved 1 km/hr slower, he would have taken 10 minutes more. What is the distance (in km) that he jogged?

(a) 9
(b) 10
(c) 12
(d) 8

Answer: (c)

96. Ramesh travels by bus from city A to city B at an average speed of 44 km/hr. Suresh travels by taxi from city A to city B at an average speed of 77 km/hr and takes 3 hours lesser than time taken by Ramesh. What is the distance (in km) between the two cities?

(a) 363

(b) 308

(c) 280

(d) 336

Answer: (b)

97. In 4 years at simple interest the principal increases by 12%. Calculate the amount (in Rs) received at the end of 2 years on Rs 20,000 at the same rate if compounded annually?

(a) 21632

(b) 21218

(c) 22472

(d) 22400

Answer: (b)

98. Find the difference (in Rs) in the interest earned on Rs 10,00,000 at 10% in 1 year compounded annually and semi-annually.

(a) 250

(b) 1000

(c) 100

(d) 2500

Answer: (d)

99. A bank gives Rs 25,000 on a saving a certain principal in 2 years at 8% rate of interest. How much will the bank give (in Rs) on the same principal in 4 years at the same rate of interest compounded annually?

(a) 27000

(b) 29000

(c) 29160

(d) 27080

Answer: (c)

100. Find the rate of interest (in %) if simple interest earned on a certain sum for the 3 years is Rs 900 and compound interest earned in 2 years is Rs 636?

(a) 12

(b) 10

(c) 9

(d) 8

Answer: (a)

Answer key

Answer key as marked in the Staff Selection Commission's response sheet. "—" means the sheet did not show it clearly.

Quantitative Abilities

1	**(b)**	2	**(b)**	3	**(d)**	4	**(d)**	6	**(b)**	8	**(b)**	9	**(a)**	10	**(a)**
12	**(a)**	13	**(a)**	14	**(c)**	15	**(d)**	16	**(a)**	17	**(d)**	19	**(a)**	20	**(a)**
23	**(c)**	24	**(d)**	25	**(d)**	27	**(c)**	28	**(b)**	29	**(a)**	32	**(c)**	33	**(b)**
34	**(b)**	35	**(b)**	36	**(c)**	37	**(c)**	38	**(b)**	41	**(b)**	42	**(c)**	43	**(c)**
44	**(b)**	45	**(d)**	46	**(d)**	47	**(c)**	48	**(c)**	49	**(a)**	50	**(b)**	51	**(b)**
52	**(a)**	53	**(c)**	54	**(d)**	55	**(b)**	56	**(a)**	58	**(c)**	59	**(d)**	60	**(b)**
61	**(c)**	62	**(b)**	64	**(a)**	65	**(a)**	66	**(c)**	67	**(d)**	68	**(b)**	69	**(d)**
70	**(c)**	71	**(b)**	72	**(a)**	73	**(b)**	74	**(d)**	75	**(b)**	76	**(d)**	77	**(c)**
78	**(b)**	79	**(d)**	80	**(b)**	81	**(a)**	82	**(b)**	83	**(d)**	84	**(c)**	85	**(c)**
86	**(a)**	87	**(a)**	88	**(a)**	89	**(a)**	90	**(c)**	91	**(d)**	92	**(a)**	93	**(d)**
94	**(c)**	95	**(c)**	96	**(b)**	97	**(b)**	98	**(d)**	99	**(c)**	100	**(a)**		