megaleap
Comprehensive MCA Entrance Coaching

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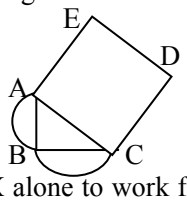
M.C.A. ENTRANCE **MTPO – I** **MAXIMUM TIME: 165 MINUTES**
TOTAL QUESTIONS: 100

1. The area of the square on AC as a side is 60 cm^2. What is the sum of the areas of semicircles drawn on AB and BC as diameters given ABC is a right angled triangle and AC is its hypotenuse.



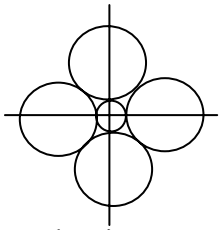
(a) 7.5 π cm^2
(b) 60 cm^2
(c) 30 π cm^2
(d) 30 cm^2

2. A job was completed by making Mr X alone to work for the first 40 days and by making Mr Y alone to work for the next 15 days. When they worked together they were able to complete the job in 25 days. Who is efficient?
(a) Mr X (b) Mr Y (c) both (d) none

3. There are 10 machines making tablets of the same weight 4 gms each and one machine is making tablets of weight one gm more. The machines are numbered one, two, three, ... ten. One tablet from the first machine, two from the second ..... and ten from the last are picked and weighed. The total weight of all the tablets is found to be 224 gms. The number of the machine making tablets of weight 5 grams each is....
(a) 4 (b) 3 (c) 5 (d) 10

4. Ram paints the walls of a room of dimensions 6m × 4m × 3m in 2 days and Joseph paints the walls of a room of dimensions 5m × 6m × 3m in 3 days. Their efficiencies are in the ratio....
(a) 3:5 (b) 15:11 (c) 7:8 (d) 6:5

5. A small coin is surrounded by four large coins of the same size as shown in the figure. What is the ratio of the radius of the smaller coin to that of the larger coin?



(a) 1 : 2
(b) 2 : 3
(c) 1 : 1 + √2
(d) 1 + √2 : 1

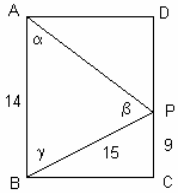
6. S_1 and S_2 are two sets of parallel lines. They intersect at 12 points. The number of parallelograms that S_1 and S_2 may form is
(a) 12 or 6 (b) 8 or 4 (c) 18 (d) 18 or 15

7. Given x is real and positive, the number of solutions of $e^{4x} + e^{3x} - 3e^{2x} + e^{x} + 1 = 0$ is
(a) four (b) three (c) two (d) zero

8. Three varieties A, B, C of coffee seeds selling at Rs. 60, Rs. 70 and Rs. 80 a kg are to be mixed in a certain ratio so that the cost of the mixture may be Rs. 75. What is the ratio in which A, B, C are to be mixed?
(a) 1 : 1 : 4 (b) 2 : 3 : 1
(c) 4 : 1 : 5 (d) 1 : 2 : 3

9. The AM of marks scored by pupils in a class is 42. The AM of marks scored by boys is 39 and the AM of marks scored by girls is 43. The ratio of the number of boys to the number of girls is...
(a) 3 : 1 (b) 1 : 3 (c) 1: 1 (d) 2 : 3

10. ABCD is a rectangle. PC = 9 cms, BP = 15 cms AB = 14 cms, then the angles of Δ ABP are such that



(a) α > β > γ
(b) α > γ > β
(c) β > γ > α
(d) α < β < γ

11. There are two bags A and B. A contains 5 red balls and 3 black balls and B contains 4 red balls and 5 black balls. One of the bags is chosen at random and a ball is picked. It is found to be black. What is the probability that it is chosen from bag A?
(a) 1/2 (b) 2/3 (c) 45/77 (d) 40/77

12. Given P(A′ ∩ B) = 2/15 and P (A ∩ B′) = 1/6 and A, B are independent events than P(A) is equal to
(a) 5/6 (b) 2/5 (c) 3/5 (d) 1/3

13. The probability of A hitting a target is a and the probability of B hitting the target is 2a. The one who hits the target is a winner. The game is started by A and if he loses B will try. If B loses, A will try. It is found that the probability that A may win the game is 3/7. Therefore the value of a is
(a) 1/4 (b) 1/3 (c) 2/5 (d) 1/5

14. There are nine distinct numbers of which five are positive and four are negative. Three numbers are chosen at random and the product of the numbers is formed. How many different products can be formed which are positive in nature?

(a) 48 (b) 50 (c) 40 (d) 90

15. The elements a 2×2 matrix are either 1 or zero. How may of such matrices are singular matrices?

(a) 10 (b) 6 (c) 16 (d) 12

16. Consider the set A = {1, 2, 3, 4, 5, 6}. Let R be a relation in A × A. If a < b then a is R related to b. How many elements are in R?

(a) 30 (b) 25 (c) 5 (d) 15

17. Consider the set A = {1, 2, 3, 4, 5, 6}. Let R be a relation in A × A. If both a and b are not even the a is R related to b. How many elements are in R?

(a) 10 (b) 25 (c) 18 (d) 27

18. The number of solutions of $2x+3y = a$ and $ax+6y = b$ will be many, if $a + b$ is equal to

(a) 6 (b) 9 (c) 10 (d) 12

19. Given $f(x) = 2x+3$ and $f_0\ f(x-1) = 5$ implies $x =$

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

20. The line joining the points (1, 2) and (2, 3) is parallel to the tangent at a point A on $Y = x^2$. What are the coordinates of A?

(a) (1, 1) (b) (2, 4) (c) (0, 0) (d) (1/2, 1/4)

21. The minimum value of $\cos 2x + 2\cos x$ is

(a) zero (b) –3/2 (c) 1 (d) 1/2

22. The perimeter of a sector of a circle is 40cms. Find its central angle, given its area is maximum.

(a) 2° (b) 1 radian (c) π radians (d) 2 radians

23. Given $3xy + 2y - 6x - 3 = 0$, what is the value of y_3, when $x = 0$ [y_3 is the third derivative of y w. r to x]

(a) 81/8 (b) 10 (c) 15 (d) 100/7

24. The value of $\underset{x\to 0}{\text{Lt}} \left(\frac{a^x + b^x + c^x}{3}\right)^{\frac{1}{x}}$ *is*

(a) $(a\,b\,c)$ (b) $(a\,b\,c)^{1/3}$ (c) 1 (d) $\log(a\,b\,c)$

25. Given $u = x^y$ the value of $\frac{\delta^2 u}{\delta x \delta y}$ at $x = 1,\ y = k$ is

(a) k (b) k^2 (c) e^k (d) 1

26. Given $x^2 = e^{x+y}$ evaluate $\int_1^2 y\,dx$

(a) $4\log 2 - 5$ (b) $4\log 2 - (7/2)$

(c) e^2 (d) $4\log 2$

27. A solution of $x\,dy = (x^3 - y)dx$ is

(a) $4xy = x^4 + c$ (b) $xy = x^4 + c$

(c) $y = x^4 + c$ (d) none of these

28. From a solid cylinder of height 10 cms and radius 5cms, a conical cavity to a depth of 3cms followed by a cylindrical bore of radius 3cms is made. The volume of material in the solid is

(a) 150π cm^3 (b) 142π cm^3 (c) 138π cm^3 (d) 128π cm^3

29. The number of real solutions of the equation $x^6 + x^5 + x^4 + x^3 + x^2 + x + 1 = 0$ is .....

(a) 1 (b) 6 (c) 2 (d) zero

30. Given α, β, γ are the roots of $f(x) = x^3 + 3x^2 + 4x + 1 = 0$ then the value of $f(\alpha + \beta + \gamma)$ is ....

(a) zero (b) 11 (c) 12 (d) –11

31. $\sum_1^\infty \frac{3n+1}{n!}$ is equal to

(a) e (b) $4e$ (c) $4e-1$ (d) $e-1$

32. The equation $x^2 + px + q = 0$ has exactly one root between $x = 0$ & $x = 1$. Therefore $q(1 + p + q)$ is

(a) zero (b) > 0 (c) < 0 (d) > 0 or < 0

33. The A.M. of 20 entries is 55. The values of the 20% of the entries are increased by 3 each, and the values of 50% of the entries are increased by 8 each. What is the A.M. of the new entries?

(a) 57.6 (b) 58.6 (c) 59.6 (d) 60

34. Find the variance of 10 entries each equal to 5 and 15 entries each equal to 8.

(a) 2 (b) 2.16 (c) 3.16 (d) 3.26

35. The sum of the series $\sum_1^\infty \frac{n^2}{n!}$ converges to

(a) e (b) $2e$ (c) $2e-1$ (d) $5e$

36. Given the product of two of the roots of the equation $x^3 + px^2 + qx + r = 0$ is one, identify the correct statement

(a) $p + q + r = 0$ (b) $p + q = r$

(c) $p^2 + q^2 = r^2$ (d) $r^2 = pr - q + 1$

37. One of the eigen values of a square matrix A is zero. Therefore

(a) A is a singular matrix

(b) A is a non-singular matrix

(c) A^{-1} exists (d) $A^2 = I$

38. The characteristic roots of $\begin{pmatrix} 1 & a & b \\ 0 & 2 & c \\ 0 & 0 & 3 \end{pmatrix}$ are

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

39. The characteristic roots of the matrix A – 3I are 2, 4, 3. What are the characteristic roots of matrix A?

(a) 5, 7, 6 (b) –1, 1, 0 (c) 6, 12, 9 (d) none

40. $\cos 20\ \cos 40\ \cos 80$ is equal to

(a) $\cos 60$ (b) $\cos 30$ (c) 1/4 (d) 1/8

41. The number of values of x satisfying $\cos x + 2\cos 2x + 3\cos 3x + 4\cos 4x + 12 = 0$ is

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

42. Find the value of a if the vector (a, 6, 5) is a linear combination of the vectors (1, 2, 1) & (5, 3, 2)

(a) 5 (b) 17 (c) 9 (d) 8

43. Are the polynomials $f_1(x) = x^2 + 2$, $f_2(x) = 2x - 6$ and $f_3(x) = 5$ are linearly dependent?

(a) yes (b) no (c) depends on the value of x (d) none

44. Given a, b are vectors, then the value of

$[a \times b \quad a\ b]$ is (a and b are not parallel)
(a) zero (b) negative
(c) positive (d) + ve or – ve

45. The ortho – centre of Δ ABC is H. What is the value of HA.BC + HB.CA + HC.AB?
(a) zero (b) positive if Δ ABC is acute angled
(c) positive if Δ ABC is obtuse angled
(d) positive if Δ ABC is equilateral

46. The projection of $2i + j + k$ on the normal to the plane $x + 2y + z = 8$ is
(a) 5 (b) $5/\sqrt{6}$ (c) 5/6 (d) 4

47. The plane $2x + y + z = 12$ meets the x, y, z axes at A, B, C. Find the volume of the tetrahedron OABC? (O is the origin).
(a) 144 cubic units (b) 864 cubic units
(c) 288 cubic units (d) 432 cubic units

48. The distance between the parallel planes $2x + 2y + z = 30$ and $2x + 2y + z + 30 = 0$ is
(a) 20 (b) 30 (c) 10 (d) 6

49. Given $|Z_1 + Z_2| = 12$ and $|Z_1 - Z_2| = 6$ the value of $|Z_1|$ lies between …
(a) 3 and 9 (b) 0 and 12
(c) 5 and 11 (d) 0 and 9

50. One of the values of $\sqrt{i}$ is
(a) i (b) $-i$ (c) $(1+i)$ (d) $(1+i)/\sqrt{2}$

51. Given $(x+iy)(3+4i) = 1+i$, the value of $x+y$ is
(a) 2 (b) 3 (c) 5/25 (d) 6/25

52. Given $|Z| = 2$, then the locus of P which represents $-5Z + 1$ is …
(a) a straight line (b) a circle of radius 9 units
(c) a parabola (d) a circle of radius 10 units

53. The value of $\int_0^{\pi/2} x \sin x \cos x\, dx$ is
(a) Zero (b) π (c) π/8 (d) π/4

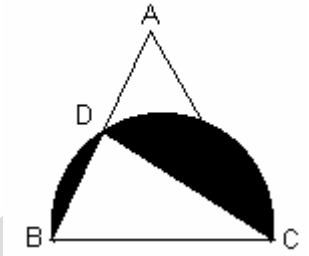
54. The value of $1^2 - 2^2 + 3^2 - 4^2 + ... + 99^2 - 100^2$ is
(a) –5050 (b) 5050 (c) 5150 (d) –5000

55. ABCDEF is a regular hexagon of area $\frac{6\sqrt{3}}{4}a^2$. P is a point inside the hexagon. If PG, PH, PI, PJ, PK, PL are drawn perpendicular to the sides AB, BC, CD, DE, EF, FA then the value of PG+PH+PI+PJ+PK+PL is equal to
(a) $6 \cdot \sqrt{3} \cdot a$ (b) $3 \cdot \sqrt{3} \cdot a$ (c) $3a$ (d) none

56. There are 5 balls in a bag. One ball is picked and it is found to be red. What is the probability that all balls in the bag are red?
(a) 0 · 2 (b) 0 · 4 (c) 0 · 5 (d) 0 · 6

57. Given $U_n = 1 + 2 + ... + n$. Find the value of $U_1 + U_2 + ... + U_{10}$
(a) 550 (b) 220 (c) 330 (d) 440

58. ABC is an equilateral of side 14 cms. A semi circle on BC as diameter is drawn to meet AB at D. Find the shaded area of the diagram (π = 22/7)
(a) 77 cm^2
(b) $(77 - 49 \cdot (\sqrt{3}/2))$ cm^2
(c) 49 cm^2
(d) $(88 - 49 \cdot \sqrt{3})$ cm^2



59. $f(x) = 0$ is a polynomial equation of degree n and all its roots are real. Therefore the number of real roots of $d/dx(f(x)) = 0$ is
(a) $n-1$ (b) $< n-1$ (c) $n-2$ (d) none

60. If 3 is a root of $x^3 - 5x^2 + ax - b = 0$ and if all the roots are real, the maximum value of b will be
(a) 3 (b) 5 (c) 4 (d) 6

61. The planes $x + y + z = 3$, $2x + y + z = 4$ and $3x + 2y + z = 6$
(a) will form a prism
(b) will have a line of intersection
(c) will have a common point of intersection
(d) will not have a common point of intersection

62. Given $f(x)$ tends to $g(a)$ when x tends to a, $f'(a)$ is equal to zero and $f''(a) = 12$. What is the value of $\underset{x \to a}{Lt} \frac{f(x)-g(a)}{(x-a)^2}$?
(a) zero (b) 6 (c) ∞ (d) 4

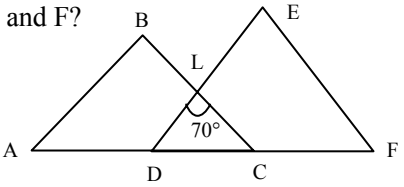
63. The number of diagonals of a regular polygon is 14. Therefore the sum of all its internal angles is
(a) 900° (b) 360° (c) 1260° (d) 720°

64. Given $f(x) = x^2 + x + 1$ and $g(x) = x^2 + 4$, the number of real values of x for which $f_0(g(x)) = 0$ will be true is
(a) 0 (b) two (c) four (d) none

65. Given α is a common root $x^2 + ax + b = 0$ and $x^2 + bx + a = 0$ then the value of $\frac{x^2 + ax + b}{x^2 + bx + a}$ as x tends to α [a is not equal to b] is……
(a) $\frac{a+b}{a-b}$ (b) $\frac{2+a}{2-a}$ (c) $\frac{2+a}{1+a}$ (d) Zero

66. The value of 1 + 5 + 9 + ……+ x = 231. Therefore the value of x is
(a) 10 (b) 41 (c) 13 (d) 43

67. Given angle DLC = 70°, what is the value of the sum of the angles A, B, E and F?
(a) 270°
(b) 250°
(c) 290°
(d) none



68. Let a, b, c be the sides of a triangle ABC, Given $(a+b+c)(b+c-a) = kbc$, then k will lie between
(a) –1 and 1 (b) – 4 and 4 (c) 0 and 4 (d) 4 and 6

69. There are three temples A, B, C and a pond near the temples. A priest brings some flowers and offers a part of them to the deity in A and puts the remaining flowers into the pond. The flowers get doubled. The priest offers a part of the flowers to the deity in B and puts the remaining flowers into the pond. Again the flowers get doubled. The priest offers all the flowers to the deity in temple C. Then he had no flowers to put into the pond. Given that he offered equal number of flowers to each deity, the number of flowers that he brought is
(a) 2 (b) 7 (c) 4 (d) 1

70. $\frac{3!}{1!+2!}+\frac{4!}{2!+3!}+\ldots..$ upto n terms is equal to
(a) $(n+1)(n+2)$ (b) $\frac{(n+1)(n+2)}{2}$ (c) $(n+1)^2$ (d) $\frac{(n)(n+3)}{2}$

71. CPU available on a chip is a
(a) Microprocessor (b) Minicomputer
(c) Calculator (d) Register

72. The bus system is used for transmission of
(a) Data (b) address words
(c) Control signals (d) all the above

Questions (73) to (75) are analogies:

73. RETIREMENT : SERVICE :: _____ : _____
(a) EMPLOYMENT : SALARY
(b) ARRANGEMENT : FLOWERS
(c) CONTRACT : AGREEMENT
(d) GRADUATION : STUDIES

74. URGE : INSIST :: _____ : _____
(a) PURSUE : HOUND (b) REFUSE : DENY
(c) EXPUNGE : PURGE (d) REQUEST : DEMAND

75. TAKE : FUBL :: PLAY : _____
(a) KXZO (b) KZXO (c) ZQMB (d) ZMQB

76. Complete the series : nqqttwNQQTTW _____
(a) ZCCFFlzccffi (b) zddggkZDDGGK
(c) zcceehZCCEEH (d) zccffiZCCFFI

Question (77) to (79): Find odd man out

77. (a) Copper (b) Silver (c) Mercury (d) Iron

78. (a) A (b) H (c) T (d) D

79. (a) mnoTuV (b) zabGHI (c) hijOpQ (d) rstYza

Question (80) to (83) are based on the following
In a certain code language
(a) 745 means STUDY THIS LESSON
(b) 530 means TIME TO STUDY
(c) 108 means FINISH ON TIME
(d) 613 means BETTER TO FINISH

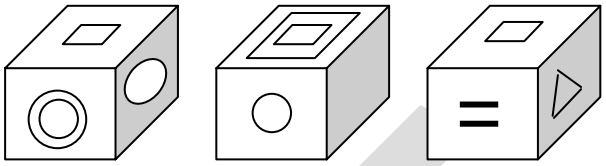
80. Which digit refers to BETTER?
(a) 1 (b) 6 (c) 3 (d) 4

81. Which digit refers to ON?
(a) a (b) 0 or 8 (c) 5 (d) 8

82. Which digit refers to THIS?
(a) 7 (b) 5 or 4 (c) 4 (d) 7 or 4

83. Which one of the four given statement is redundant in finding the answer for Question (83) to (85).
(a) i (b) ii (c) iii (d) All are relevant.

Directions (84 – 86):
Study the following three views of a single wooden cube having various markings on all its six faces.



(i) (ii) (iii)

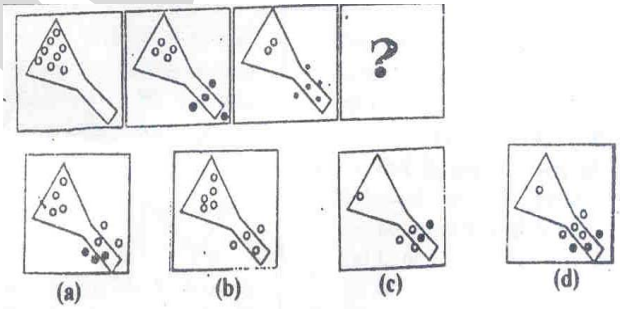
84. Which symbol is at the bottom of view (i)?
(a) ○ (b) ◎ (c) △ (d) ▭

85. Which symbol is opposite the face having double lines (〓)?
(a) ○ (b) △ (c) ◎ (d) ▭

86. Which symbol is opposite the face having (△)?
(a) ○ (b) ◎ (c) 〓 (d) ▭

87. $\lim_{n\to\infty}\left(\sqrt{n+1}-\sqrt{n}\right)$ is
(a) 0 (b) 1 (c) 2 (d) none

88.



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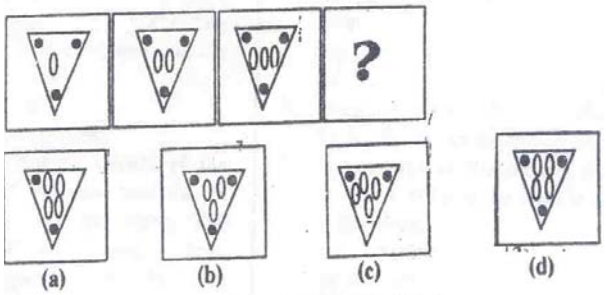

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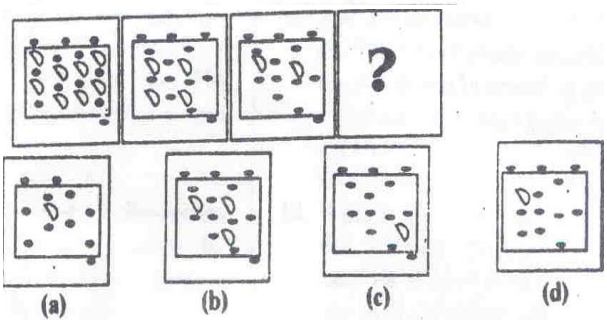

Directions (91 – 100): Each of the following problems has a question and two statements which are labeled (1) and (2). Use the data given in (1) and (2) together with other available information (such as the number of hours in a day, the definition of clockwise, mathematical facts, etc.) to decide whether the statements are sufficient to answer the question. Then fill in the space

(a) if you can get the answer from (1) alone but not from (2) alone.

(b) if you can get the answer from (2) alone but not from (1) alone.

(c) if you can get the answer from (1) together, although neither statement by itself suffices

(d) if statement (1) alone suffices and statement (2) alone suffices

All numbers used in the section are real numbers. A figure given for a problem is intended to provide information consistent with that in the question, but not necessary with the additional information contained in the statement.

91. k is an integer. Is k divisible by 8?

(1) k is divisible by 4.

(2) k is divisible by 16

92. How far is it from town A to town B? Town C is 12 miles east of town A.

(1) Town C is south of town B

(2) It is 9 miles from town B to town C.

93. How many vinyl squares with sides 5 inches long will be needed to cover the rectangular floor of a room?

(1) The floor is 10 feet long

(2) The floor is 5 feet wide

94. What is the value of x ?

(1) $x / y = 3$

(2) $x - y = 9$

95. A sequence of numbers is given by the rule $a_n = a_{n-1} + 2$. Is a_{10} an even integer ?

(1) a_1 is an even integer

(2) a_9 is 24

96. Is the radius of a circle greater than 3 ?

(1) The points with coordinates (2, 4) and (5, 10) are on the circle.

(2) The points with coordinates (2, 4) and (4, 1) are on the circle.

97. Which is larger, a^b or b^a ? $a > 0$ and $b > 0$

(1) $a = 1$

(2) $b > 2$

98. Is x greater than y ?

(1) $x = 2y$

(2) $x = y + 2$

99. Which of the four numbers w, x, y and z is the largest ?

(1) The average of w, x, y and z is 25

(2) The number of w, x and y are each less than 24.

100. Find $x + y$

(1) $x - y = 6$

(2) $2x + 3y = 7$