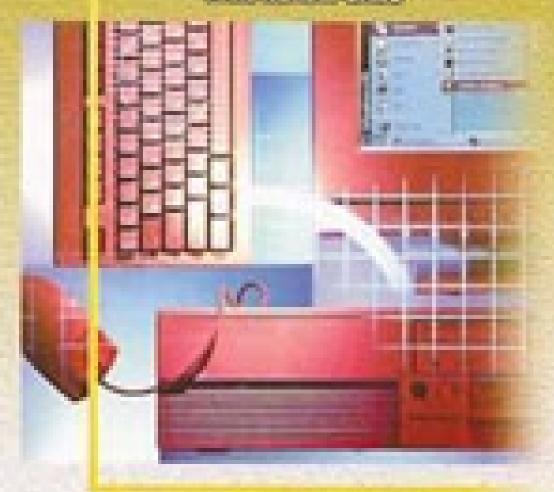
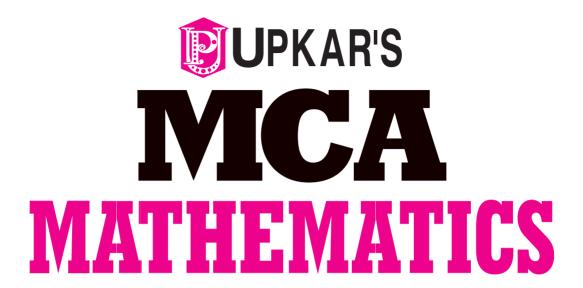


MAGA

Mathematics

ANTE KUMAR GARG





ByAnil Kumar Garg

Revised Edition

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UPKAR PRAKASHAN

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2/11A, Swadeshi Bima Nagar, AGRA-282 002

Phone: 4053333, 2530966, 2531101 **Fax**: (0562) 4053330, 4031570 **E-mail**: publisher@upkar.in **Website**: www.upkar.in

Branch Offices

4845, Ansari Road, Daryaganj,

New Delhi–110 002 **Phone :** 011–23251844/66 1-8-1/B, R.R. Complex (Near Sundaraiah Park, Adjacent to Manasa Enclave Gate), Bagh Lingampally, Hyderabad–500 044 (A.P.), **Phone:** 040–66753330

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ISBN: 978-81-7482-174-4

Price: Rs. 525.00

(Rs. Five Hundred Twenty Five Only)

Code No. 370

Printed at: UPKAR PRAKASHAN (Printing Unit) Bye-pass, AGRA

Preface

This book has been written for the help of all those students who wish to seek admission through entrance examination to various M.C.A. Institutes likes J.N.U., Pune; D.U., V.H.U., Roorkee, UPMCAT, M.P. Combined, H.C.U., BITS (Ranchi) etc.

The purpose of this book is to make the students aware of what they are expected to know and what type of questions they have to come across at the M.C.A. entrance examinations.

In this book, I have discussed complete theory with suitable illustrations in the beginning of each chapter which is followed by objective and subjective problems. Solutions of these problems have been provided at the end of the chapter.

In short this book is the best and unique of its kind.

I am grateful to Mr. Mahendra Jain, M/s. Upkar Publications, Agra who published this most useful book for the benefit of the students who are preparing of M.C.A. entrance examinations.

Suggestions for improvement in this book are welcome and would be gratefully acknowledged.

-AUTHOR

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Mathematics MCA Solved Paper

(Based on Memory)

Mathematics

- 1. Six dice are rolled. The probability, that the dice show different face points, is—
 - (A) 1/3
- (B) 6!/6⁶
- $(C) 6/6^6$
- (D) 1/6
- 2. Let $\Delta = \begin{vmatrix} a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \\ a_3 & b_3 & c_3 \end{vmatrix}$ and $\Delta_1 = \begin{vmatrix} A_1 & B_1 & C_1 \\ A_2 & B_2 & C_2 \\ A_3 & B_3 & C_3 \end{vmatrix}$

where A_1 , A_2 , A_3 , B_1 , B_2 , B_3 , C_1 , C_2 , C_3 are the cofactors of a_1 , a_2 , a_3 , b_1 , b_2 , b_3 , c_1 , c_2 , c_3 respectively. Then Δ_1 is—

- (A) Δ^2
- (B) Δ^3
- (C) Δ^4
- (D) Δ
- 3. If (x-2)(x-3) is less than 12, then x should satisfy—
 - (A) |x| < 3
- (B) |x| < 2
- (C) -1 < x < 6
- (D) |x| < 6
- 4. $\Delta = \begin{vmatrix} a^2 + x^2 & ab & ac \\ ab & b^2 + x^2 & bc \\ ac & bc & c^2 + x^2 \end{vmatrix}$ is divisible
 - by-
 - (A) x^2
 - (B) $a^2 + b^2 + c^2$
 - (C) x^4
 - (D) $(x^2 + a^2 + b^2 + c^2)x^4$
- 5 Let

P =
$$\frac{1}{\sqrt{3}}\begin{bmatrix} 1 & 1 & 1\\ 1 & -1/2 - i & (\sqrt{3})/2 & -1/2 + i & (\sqrt{3})/2\\ 1 & -1/2 + i & (\sqrt{3})/2 & -1/2 - i & (\sqrt{3})/2 \end{bmatrix}$$

then the inverse of P is-

- (A) P
- (B) _F
- (C) P^T
- (D) Conjugate of P
- 6. If $A = \{1, 3, 5\}$, B is the set of integers and f: $A \rightarrow B$ defined by $f(x) = x^2 - 1$, then the range of f is—
 - (A) $\{0, 8, 24\}$
- (B) $\{3, 9, 27\}$
- (C) $\{0, 9, 25\}$
- (D) $\{1, 9, 25\}$

- 7. The octal equivalent of FAFAFA is—
 - (A) 72752716
- (B) 76575372
- (C) 76716502
- (D) 76722466
- 8. CD drives uses—
 - (A) Optical Principles
 - (B) Mathematical Principles
 - (C) Acoustics Principles
 - (D) Magnetic Principles
- 9. Monte Carlo method is associated with—
 - (A) High speed internet connectivity
 - (B) Simulation using random numbers
 - (C) Video conferencing
 - (D) Parallel processing
- 10. BCD (Binary Coded Decimal) system uses one of the following number of bits—
 - (A) 12
- (B) 8
- (C) 6
- 6 (D) 16
- 11. The first, second and third class railway fares between two stations are as 6:4:1 and the number of passengers of the three classes are as 2:5:50. If the sale proceeds of the three classes of the tickets amount to Rs. 12,300, the total collection from the third class is—
 - (A) Rs. 7,500
- (B) Rs. 6,000
- (C) Rs. 6,500
- (D) Rs. 5,200
- 12. Three boys A, B and C appear for an examination. B gets 3/5 of A's marks and 5/6 of C's marks. The ratio of their marks (A:B:C) is—
 - (A) 5:1:6
- (B) 15:25:18
- (C) 3:5:6
- (D) 25:15:18
- 13. A manufacturer sells an item to a wholesale dealer at a profit of 18%. The wholesale dealer sells the same to a retailer at a profit of 20%. The retailer, in turn, sells it to the customer for Rs. 30·09, thereby earning a profit of 25%. Find the cost of the manufacturer—
 - (A) 16
- (B) 26
- (C) 17
- (D) 27

4A | MCA Math

- 14. A shopkeeper fixed the sale price of an article at 25% more than its cost price. In an exhibition sale, what maximum percentage reduction he can offer to the customer so that he will not have to incur any loss?
 - (A) 25%
- (B) 20%
- (C) 10%
- (D) 30%
- 15. The quantity of provision in a hostel is sufficient for 45 students for a period of 20 days. 15 of them go on vacation after 14 days. How long will the remaining provisions last?
 - (A) 10 days
- (B) 15 days
- (C) 9 days
- (D) 12 days
- 16. 25 men working 6 hours a day can do a piece of work in 36 days. Find how many men working 8 hours a day do the same work in 45 days-
 - (A) 25
- (B) 18
- (C) 15
- (D) 20
- 17. A tradesman sells one kind of sugar at Rs. 4 per kg. and losses 20%. He sells another kind of sugar at Rs. 5 per kg. and gains 25%. He mixes them together in equal proportion and sells the mixture at Rs. 6 per kg. What does he gain or loss in percentage?
 - (A) 25% loss
- (B) 20% loss
- (C) $33\frac{1}{3}\%$ gain (D) 30% gain
- 18. A sold an article to B at a profit of 20%. B sold it to C at a profit of 25%. C sold it to D at a profit of 40% if D paid Rs. 63 for the article what did the article cost for A?
 - (A) Rs. 30
- (B) Rs. 40
- (C) Rs. 20
- (D) Rs. 25
- 19. The value of a machine depreciates by 10% annually, what will be its value after 2 years if the present value is Rs. 4,000?
 - (A) Rs. 3,250
- (B) Rs. 4,550
- (C) Rs. 3,200
- (D) Rs. 3,240
- 20. Two trains are running at the speed of 75 km and 60 km an hour, respectively, on parallel rails in opposite directions, are observed to pass each other in 8 seconds and, when they are running in the same direction at the same speeds as before, a person sitting in the faster

- train observes that he passes the other in $31\frac{1}{2}$ seconds. The lengths of the trains are—
- (A) 170 m, 165 m
- (B) 120 m, 135 m
- (C) 152 m, 160 m
- (D) 168·75 m, 131·25 m
- 21. A, B and C working separately can do a certain work in 6, 8 and 12 days respectively. B and C work together for two days and then A takes C's place. How soon the work will be finished?
 - (A) 3 days
- (B) 5 days
- (C) $2\frac{1}{2}$ days
 - (D) 2 days
- 22. A man's age is 125% of what it was 10 years ago, but $83\frac{1}{3}\%$ of what it will be after 10 years. What is his present age?
 - (A) 50 years
- (B) 44 years
- (C) 55 years
- (D) 40 years
- 23. How many terms in the series, $2^{1/2} + 2 + 2 \times 2^{1/2} + 2 \times$ $2^{1/2} + 4 + 4 \times 2^{1/2} + \dots$ should be taken to make the sum $30 + 15 \times 2^{1/2}$?
 - (A) 8
- (C) 6
- (D) 10
- 24. The principal that yields a compound interest Rs. 420 during the second year at 5% per annum is-
 - (A) Rs. 8000
- (B) Rs. 7500
- (C) Rs. 8500
- (D) Rs. 7000
- 25. For the positive numbers x, y and z, the numerical value of the determinant

$$\begin{vmatrix} \log_x x & \log_x y & \log_x z \\ \log_y x & \log_y y & \log_y z \\ \log_z x & \log_z y & \log_z z \end{vmatrix}$$
 is—

- (A) $\log_x (xyz)$
- (B) $\log_{v}(xyz)$
- (C) 0
- (D) $\log_{\tau}(xyz)$
- 26. If a, b, c are in AP, then $m^2/(m+a), m^2/(m+b)$, $m^2/(m+c)$ are in—
 - (A) GP
- (B) HP
- (C) None
- (D) AP
- 27. The sum of the first n terms of the series 1/2 $+ 3/4 + 7/8 + 15/16 + \dots$ is equal to—
 - (A) $n + 2^{-n} 1$
- (B) $1 2^{-n}$
- (C) $2^n 1$
- (D) $2^n n 1$

- 28. In a college 40% of the students are boys and the rest girls. Half of the students are tall and half are short. If 10% of the students are boys and short and 40 students are girls and tall, how many of the students are boys who are tall?
 - (A) 50
- (B) 70
- (C) 75
- (D) 60
- 29. A, B are any two events. Then $[(A \cap B') \cup$ $(A' \cap B) \cap (A \cap B) =$
 - (A)
 - (B) B
 - (C) S (Sample space)
 - (D) A
- 30. Which one of the following is wrong for any three sets A, B and C, where 'U' refers to the union symbol and '∩' refers to the intersection symbol?
 - (A) $A \cup (B \cap A) = A$
 - (B) $A \cap (B C) = (A \cap B) (A \cap C)$
 - (C) $(A C) \cap (B C) = A \cap (B C)$
 - (D) $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$
- 31. If you throw a die, you are given as many rupees as the number that turns up on the die. What will be the expected value per throw in the long run?
 - (A) Rs. 5
- (B) Rs. 3·5
- (C) Rs. 4·5
- (D) Rs. 6
- 32. The range of the function $f(x) = 1/(3 \cos x)$
 - (A) (-1, 1)
- (B) (1/4, 1)
- (C) (1/4, 1/2)
- (D) (1,3)
- 33. If the roots of $px^2 + 2qx + r = 0$ and $qx^2 2\sqrt{(pr)} x + q = 0$ are simultaneously real, then—
 - (A) p/q = q/r
- (B) $2q = \pm \sqrt{(pr)}$
- (C) None
- (D) $p = q, r \neq 0$
- 34. The decimal equivalent of 32113 to the base 4 is—
 - (A) 919
- (B) 929
- (C) 939
- (D) 909
- 35. The equation $\sin^6 x + \cos^6 x = a$ has a real solution, if—
 - (A) 0 < a < 1
- (B) $1/4 \le a \le 1$
- (C) -1 < a < 1
- (D) $1/2 \le a \le 1$

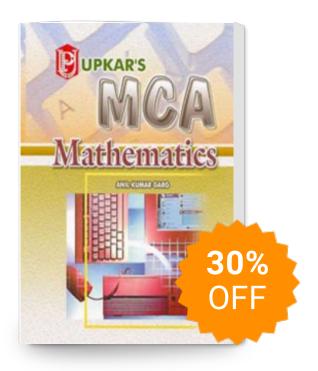
- 36. The sum of the cubes of three successive natural numbers is alsways divisible by—
 - (A) 7
 - (B) 8
 - (C) 9
 - (D) 6
- 37. The fourth term of an A is equal to 3 times the first term and the seventh term exceeds twice the third term by 1. The first term and the common difference respectively are—
 - (A) 2,3
 - (B) 3, -2
 - (C) 2, -3
 - (D) 3, 2
- 38. Which integers leave a remainder of 1 when divided by 2 and also leave a remainder of 1 when divided by 3?
 - (A) $x \equiv 1 \pmod{3}$
 - (B) $x \equiv 1 \pmod{6}$
 - (C) $x \equiv 1 \pmod{5}$
 - (D) $x \equiv 1 \pmod{2}$
- 39. A and B are two events such that P(A) = x, P(B) = y, $P(A \cap B) = z$ where '\cap ' refers to intersection. Then $P(A^{\wedge} \cap B^{\wedge})$ where $^{\wedge}$ refers to negation is-
 - (A) 1 x y
- (B) 1 x y + z
- (C) (1-x)(1-y) (D) 1-z
- 40. If x + y = 2z, then the value of $\frac{x}{x z} + \frac{y}{y z}$

 - (A) 1 (B) 2
 - (C) -2
- (D) 0

Instructions—(Q. 41–45) must be answered with reference to the following statements:

There are three paths in the government gardens at Shimla. The paths are having directions on eight signboards on the roads surrounding the Ashoka hotel and Governor's guest house. The boards are named as A, B, C, D, E, F, G and H. The mountain road goes in a winding way from hotel to A to C to G and B and then to Governor's house. The state road goes from Ashoka hotel to C to E to F to B to D and back to Ashoka hotel. The walker's road starts at the hotel and goes from H to E to G and back to hotel. There are no other roads available. The roads can be traversed in both directions.

MCA Mathematics



Publisher: Upkar Prakashan ISBN: 9788174821744 Author: Anil Kumar Garg

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