NIMCET/JNU REVISION SCHEDULE OPEN TO ALL

24/4/06	Set Theory
25/4/06	Trigonometry + Test (Set theory)
26/4/06	Algebra + Test (Trigonometry)
27/4/06	Co-ordinate + Test (Algbra)
29/04/06	Vectors, Probability Statistics + Test (Co-ordinate)
01/05/06	Calculus + Test (Vector & Prob. Stats)
02/05/06	Reasoning + Test (Calculus)
03/05/06	Computers + Test (Reasoning)
05/05/06	Test (Set theory + Trigono. + Algebra + Reasoning)
06/05/06	Test Coordinate, Calculus, Vector Prob. Stars, + Computer
07/05/06	JNU MODEL - 01
08/05/06	NIMCET MODEL - 02
09/05/06	JNU MODEL - 02
10/05/06	NIMCET MODEL - 02
11/05/06	JNU MODEL - 03
12/05/06	NIMCET MODEL - 03

JAWAHARLAL NEHRU UNIVERSITY (JNU)MCA

Master of Computer Applications (MCA)

PROGRAMMES OF STUDY :

This three-year Programme is designed to provide necessary theoretical background and pratical experience in Computer Science and Applications to meet the growing manpower requirement in automatic computing .

ELIGIBILITY FOR ADMISSION :

M.C.A. : Bachelor's degree in any discipline with adequate competence in Mathematics under 10 + 2 + 3 pattern of education with at least 55% marks .

SYLLBUS :

The questions in the examination for addmission to programme may cover the following areas of study as well as their applications :

(a) Trigonometry
(b) Modern Algebra and Matrix theory
(c) Theory of Education
(d) Calculus and Analytical Geometry
(e) Real Analysis
(f) Differential Equation
(g) Statics & Probability
(h) Elementary Numerical Analysis
(i) Logical Ability
(j) Fundamentals of computer
(k) Elements of Data Structures
(l) Computer Organisation
(m) C Language

The question paper will consist of multiple choice questions .

NIT MCA ENTRANCE SYLLABUS

MATHEMATICS : (40 Questions)

- **Set theory :** Concepts of sets - Union - Intersection - Cardinality - Elementary counting, Permutation and combinations .
- **Probability and Statistics :** Basic concepts of probabiluty theory, Averages, Dependent and independent events, frequency distributions, measures of central tendencies and dispersions.
- **Algebra :** Fundamental operation in Algebra, Expansion, Factorization, simultaneous linear quadratic equation, indices, logarithms - arithmetic, geometic and harmonic progression, determinats and matrices.
- **Coordinate Geometry :** Rectangular Cartesian coordinates, distance formulae, equations of line, intersection of lines, pair of straight lines, equations of circle, parabola, ellipse and hyperbola.
- **Calculus :** Limit of functions, Continuous functions, Differentiation of functions, tangents and normals, simple examples of maxima and minima. Intergration of function by parts, by substitution and partial fraction Definite integrals, Applications of Definite integrals to areas.
- **Vectors :** Position vector, addition and subtraction of vectors, scalar and vectors, scalar and vector products and their applications to simple geometrical problem and mechanics.
- **Trigonometry :** Simple identities, trigonometric equations, proerties of triangles, solution of triangles, heights and distances, General solutions of trigonometric equations.

ANALYTICALABILITY AND LOGICAL REASONING : (60 questions)

- The questions in this section will cover logical reasoning and quantitative aptitude. Some of the questions will be on comprehension of a logical sitution and questions based on the facts given in the passage.

COMPUTER AWARENESS : (10 questions)

- **Computer Basics :** Organization of a computer, Central Processing Unit (CPU), Structure of instructions in CPU, input / output devices, computer memory, back - up devices]
- **Data Representation :** Rep[resentation of characters, integers and fractions, binary and hexadecimal representations, Binary Arithmetic : Addition, subtraction, multiplication, division, simple arithmetic and two's

Original Question Paper for JNU MCA - 2005

Exam on 16 May 2006

By GOPAL AGRAWAL

M.M. : 480 **TIME : 3 Hrs.**

Note : + 4 Marks for correct response, - 1 Marks for incorrect response

02 Which of the following operatiors be overloaded ? **(JNU-2005)**
(a) Subscripting opertator (b) Function call operator
(c) Membership operator (d) Assigment opertor
(d)

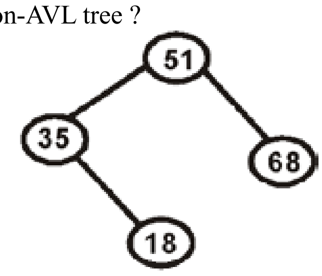
03. A survey shows that 63% of Indians like banana wheres 76% like apples. If x% of Indians like both banana and apples, then **(JNU-2005)**
(a) x = 39 (b) x = 63
(c) $36 \le x \le 63$ (d) none of these (c)

05. Total number of commutative binary poeration on a finite set containing n elements is **(JNU-2005)**
(a) $n^{\frac{n(n+1)}{2}}$ (b) $n^{\frac{n(n-1)}{2}}$
(c) n^{n^2} (d) 2^{n^2} (a)

06. Which of the following is correct ? **(JNU-2005)**
(a) 1 + i > 2 - i (b) 2 + i > 1 + i
(c) 2 - i > 1 + i (d) none (d)

07. The encoding scheme that uses only both polarities to represent binary 1 & 0 is **(JNU-2005)**
(a) bi-phase (b) biploar
(c) polar (d) unipolar (c)

08. Which of the following insertins in the AVL tree below will result in anon-AVL tree ? **(JNU-2005)**



(a) 15 (b) 37
(c) 70 (d) none (d)

09. If the complex numbers sinx + i cos 2x and cos x - i sin 2x are conjugate to each other, then x is equal to **(JNU-2005)**
(a) $n\pi$ (b) $(n + 1/2)\pi$
(c) 0 (d) none of these (d)

10. If A1, A2 be two AMs and G!, G2 be two gms between a and b, then $\frac{A1+A2}{G1G2}$ is eqaul to **(JNU-2005)**
(a) $\frac{a+b}{2b}$ (b) $\frac{2b}{a+b}$
(c) $\frac{a-b}{2b}$ (d) $\frac{a+b}{\sqrt{b}}$ (c)

11. Which of the following process models will be used to develop a software product for which critical requairements are poorky understood ? **(JNU-2005)**
(a) Waterfall (b) Throw - Prototyping
(c) Evolutionary prototyping (d) Incremental (b)

12. The coefficient of x^{99} in the expansion of (x - 1)(x - 2)...(x - 100) is equal to **(JNU-2005)**
(a) 5050 (b) 5000
(c) - 5050 (d) - 5000 (c)

13. The determinant $\Delta = \begin{vmatrix} a & b & a\alpha+b \\ b & c & b\alpha+c \\ a\alpha+b & b\alpha+c & 0 \end{vmatrix}$ is equal to zero, if **(JNU-2005)**
(a) a, b, c are in A.P (b) a, b, c are in G.P. (b)
(c) a, b, c are H.P. (d) no relation between a, b, c

14. If sets A and B are defined as $A = \{(x, y) : y = e^x, x \in R\}$ **(JNU-2005)** $B = \{(x, y) : y = x, x \in R\}$ then
(a) $B \subset A$ (b) $A \subset B$
(c) $A \cap B = \phi$ (d) $A \cup B = A$ (c)

15. In LRU page replacement algorithm, the pages to be replaced are taken from **(JNU-2005)**
(a) the past knowledge (b) the future knowledge
(c) the present knowledge (d) Depends on the page size of the processes (a)

16. The number of solutions of the equation $5^x + 5^{-x} = \log_{10} 25, (x \in R)$ is **(JNU-2005)**
(a) 0 (b) 1
(c) 2 (d) infinitely many (a)

17. If is even ${}^nC_0 < {}^nC_1 < {}^nC_2 < ... < {}^nC_r > {}^nC_{r+1} > {}^nC_{r+2} > ... > {}^nC_n$, then r is equal to **(JNU-2005)**
(a) $\frac{n}{2}$ (b) $\frac{n-1}{2}$
(c) $\frac{n-2}{2}$ (d) $\frac{n+2}{2}$ (a)

18. A system multiplexes 10 chnnels of capacity 128 kbps each into a channel of 1024 kbps capacity using synchronous Tine Division multiplexing. The number of channels, system will be able to multiples if it uses asynchronous time division multiplesing, is **(JNU-2005)**
(a) 18 (b) 10
(c) 15 (d) 22 (c)

19. The number of times the digit 3 will be written when listing the integers from 1 to 1000 is **(JNU-2005)**
(a) 269 (b) 300
(c) 271 (d) 302 (b)

20. On your way to work, you have to drive through a busy junction where you may be stopped at traffic hight is 2 minutes of green followed by 3 minutes of red. what is the expected delay in the journey, if you arrive at the junction at a random time uniformly distributed ouer the whole 5- minute cycle is ?

(JNU-2005)

(a) 9/10 minute (b) 3/5 minute
(c) 1/5 minute (d) 3/2 minute (d)

21. The coefficent of x^5 in the expansion of $(1 + x)^{21} + (1 + x)^{22} + ... + (1 + x)^{30}$ is (JNU-2005)

(a) $^{51}C_5$ (b) $^{9}C_5$
(c) $^{31}C_6 - {}^{21}C_6$ (d) $^{30}C_6 - {}^{20}C_5$ (c)

22. What is the checksum code for a block of 5 messaged defined by codes 48H, 65h, 6CH, 70H and 2IH ? (JNU-2005)

(a) 276H (b) 1AOH
(c) AAh (d) AIH (d)

23. The sum of the series $1+\frac{1^2+2^2}{2!}+\frac{1^1+2^2+3^2}{3!}+\frac{1^2+2^2+3^2+4^2}{4!}+...$ is (JNU-2005)

(a) 3e (b) $\frac{7}{6}e$
(c) $\frac{8}{6}e$ (d) $\frac{9}{6}e$ (b)

24. Let X have the poission distribution with parameter λ, such that P(x = k + 1) = r(k) P(x = k). Then r(k) is (JNU-2005)

(a) $\frac{\lambda}{k+1}$ (b) $\frac{\lambda}{k}$
(c) $k\lambda$ (d) $\frac{k\lambda}{k+1}$ (a)

25. Consider a relation R(P, Q, R, S) with the set of functional dependencies $F = \{PQ \to R, R \to S, S \to P\}$ Which of the following is a key of R ? (JNU-2005)

(a) PQ (b) QR (d)
(c) QS (d) All of the above

26. The number of ways in which n distinct objects can be put into two different boxes so that no box remains empty is (JNU-2005)

(a) $2^n - 1$ (b) $n^2 - 1$
(c) $2^n - 2$ (d) $n^2 - 2$ (c)

27. $\sum_{n=0}^{\infty}\frac{(\log_e x)n}{n!}$ is equal to (JNU-2005)

(a) $\log_e x$ (b) x
(c) $\log_x e$ (d) none (b)

28. What will be the out of the following C program ? (JNU-2005)

```
main( )
{ int i, n = 5
for(i = 1 ; i < = n ; i + + )
printf("%d", funct 1(i)) ;
}
int funct 1 (int n)
{ if n > 0
return(n + funct 1(n - 1)) ;
else return (0) ;
}
```

(a) 1 3 6 10 15 (b) 3 6 10 15 21
(c) 1 3 7 9 15 (d) none (a)

29. The resultant of three equal like-parallel forces acting at the vertices of atriangle acts at its (JNU-2005)

(a) incentre (b) circumcentre
(c) orthocentre (d) centroid

31. The coefficient of x^n in the expansion of $\log_a(1 + x)$ is (JNU-2005)

(a) $\frac{(-1)^{n-1}}{n}$ (b) $\frac{(-1)^{n-1}}{n}\log_a e$
(c) $\frac{(-1)^{n-1}}{n}\log_e a$ (d) $\frac{(-1)}{n}\log_a e$ (b)

32. What is a system call ? (JNU-2005)

(a) Interface between process and hardware
(b) Interface between OS and hardware
(c) Interface between Process and os
(d) none of these (b)

33. The inverse of a diagonal matrix is (JNU-2005)

(a) a symmetric matrix
(a) a skew-symmetric matrix
(c) a diagonal matrix
(d) none of these (c)

34. The vector interrupt address of "TRAP" in 8085 microprocessor is (JNU-2005)

(a) 0034 H (b) 003 CH
(c) 002 CH (d) 0024 H (b)

35. The rank of a null matrix (JNU-2007)

(a) is 0 (b) is 1
(c) does not exist (d) none of these (a)

36. If every pair from among the equations $x^2 + px + qr = 0$, $x^2 + qx + rp = 0$ and $x^2 + rx + pq = 0$ has common root, then the sum of the three common roots is (JNU-2005)

(a) 2(p + q + r) (b) p + q + r
(c) - (p + q + r) (d) pqr (b)

37. If $\begin{vmatrix} p & q-y & r-z \\ p-x & q & r-z \\ p-x & q-y & r \end{vmatrix}=0$, then the value of $\frac{p}{x}+\frac{q}{y}+\frac{r}{z}$ is

(a) 0 (b) 1 (c)
(c) 2 (d) 4 pqr (JNU-2005)

38. In a complete binary search tree with 7 nodes. Maximum number of searches required to search an element is (JNU-2005)

(a) 7 (b) 4
(c) 3 (d) none (b)

40. There are two bags each containing n-balls. A boy has to select an equal number of balls from both the bags. The number of ways in which boy can choose at least one ball from each has is (JNU-2005)

(a) $^{2n}C_n$ (b) $(^nC_n)^2$ 0
(c) $^{2n}C_1$ (d) $^{2n}C_n - 1$

41. Unsafe state is deadlock state (JNU-2005)

(a) True (b) False
(c) May be (d) Cannot be (d)

43. Thrashing result in (JNU-2005)

(a) high computing activity (b) high I/O
(c) low I/O (d) none (a)

48. If p and q are point variables, which of the following operations is valid ? (JNU-2005)

(a) p + q (b) p - q
(c) both (1) and (2) (d) none (c)

50. The gray code of $(01101010)_2$ is (JNU-2005)

(a) 01110111 (b) 01011111
(c) 10001000 (d) 10101000 (b)

53. let A be a square matrix of order $n \times n$ and k is a scalar, then adj (kA) is equal to (JNU-2005)

(a) k adj A (b) kn adj A
(c) k^{n+1} adj A (d) k^{n+1} A (c)

55. Most efficient way of implementing priority quence is by **(JNU-2005)**
(a) circular array (b) heap
(c) B+ tree (d) linked list (d)

57. If a and b $(\neq 0)$ are the roots of the quadratic equation $x^2 + ax + b = 0$, then the least value of $x^2 + ax + b$ $(x \in R)$ is **(JNU-2005)**
(a) 9/4 (b) -9/4
(c) -1/4 (d) 1/4 (b)

61. Which of the following is false about vertual functions ? **(JNU-2005)**
(a) Pure vertual functions force the programmer to redefine the function inside the derved classes
(b) We cannot have a vertual constructor, but we can have vertual destructor
(c) A vertual function cannot be a friend of another class
(d) Vertual function cannot be static members (d)

65. The propagation of operations is referred as **(JNU-2005)**
(a) aggregation (b) association (d)
(c) triggering (d) none of the above

68. In C language size of ('a') returns **(JNU-2005)**
(a) 1 (b) 2
(c) 4 (d) 8 (b)

70. The number of real roots of the equation $e^{x-1} + x - 2 = 0$ is **(JNU-2005)**
(a) 1 (b) 2
(c) 3 (d) 4 (a)

73. For any complex number z, the manimum value of $|z| + |z - 1|$ is **(JNU-2005)**
(a) 1 (b) 0
(c) 1/2 (d) 3/2 (a)

74. The sum of the magnitudes of two forces acting at a point is 18 and the magnitude of their resultant is 12. If the resultant is at 90^0 with the force of similar magnitude, their magnitudes are **(JNU-2005)**
(a) 3, 15 (b) 4, 14
(c) 5, 13 (d) 6, 12 (c)

75. Given p and $(p \wedge \neg q) \rightarrow \neg p,$ proves
(a) q $\rightarrow$ p (b) p $\rightarrow$ q
(c) p (d) q (d)

76. The last three digits of a telephone number have been erased and all we know is that the number was 25785 ???. Assuming that all possibilities are equally likely, the probability that the missing digits are all equal to each other is **(JNU-2005)**
(a) 0.001 (b) 0.006
(c) 0.010 (d) 0.270
(c)

79. The bandwidth of an FM signal carrying a message signal of 12 MHz bandwidth is **(JNU-2005)**
(a) 24 MHz (b) 48 MHz
(c) 96 MHz (d) 120 MHz (d)

81. If the letters of the word 'REGULATION' be arranged at random, the probability that there will be exactly 4 letters between R and E is **(JNU-2005)**
(a) 1/10 (b) 1/9 (c) 1/5 (d) 1/2 (b)

82. If cos A + cos B = m and sin A + sin B = n where m, $n \neq 0,$ then sin (A+ B) is equal to **(JNU-2005)**
(a) $\frac{m}{m^2+n^2}$ (b) $\frac{2m}{m^2+n^2}$ (c) $\frac{m^2+n^2}{2m}$ (d) $\frac{m}{m^2+n^2}$ (b)

83. What will be output of the following 'C' code ? **(JNU-2005)**
If ("abc" == "abc")
Print f ("Yes/n");
else
Print f("No/n");
(a) Yes (b) No
(c) Cannot be determined (d) none (c)

84. The general solution of sin x - 3 sin 2x + sin 3x = cos x - 3 cos 2x + cos 3x is **(JNU-2005)**
(a) $n\pi + \frac{\pi}{8}$ (b) $\frac{n\pi}{2} + \frac{\pi}{8}$ (b)
(c) $(-1)^n\left(\frac{n\pi}{2} + \frac{\pi}{8}\right)$ (d) $2n\pi + \cos^{-1}(3/2)$

86. If G is an Abelian group, then for all $a, b \in G, b^{-1} \times a^{-1} \times b \times a$ is equal to **(JNU-2005)**
(a) $a \times b$ (b) $a^{-1} \times b^{-1}$
(c) e (d) none (a)

87. The additive group of integers is a cyclic group generated by **(JNU-2005)**
(a) 1 (b) 2
(c) 3 (d) none (b)

88. The imaginary part of $\tan^{-1}(5i/3)$ is **(JNU-2005)**
(a) 0 (b) ∞
(c) log 2 (d) log 4 (b)

89. Two like forces of 5N and 15N act on a light rod at two points A and B respectively 6 m apart. The resultant from the point A are respectively **(JNU-2005)**
(a) 10N, 4.5m (b) 20N, 4.5m
(c) 20N, 1.5m (d) 10N, 1.5m (b)

90. X.25 has **(JNU-2005)**
(a) 3 layers (b) 5 layers
(c) 2 layers (d) 4 layers (c)

92. A body of weight 60 kg rests on rough horizontal plane, whose coefficient of friction is 2/3. The least force acting horizontally that would move the body is **(JNU-2005)**
(a) 10 kg wt (b) 50 kg wt
(c) 40 kg wt (d) 39 kg wt (c)

93. If they complex numbers z_1, z_2, z_3 are in A.P, Then they lie on a/an **(JNU-2005)**
(a) circle (b) parabola
(c) line (d) ellipse (c)

94. Which one is the cntrapositive of q $\rightarrow$ p ? **(JNU-2005)**
(a) p $\rightarrow$ q (b) $\neg p \rightarrow \neg p$
(c) $\neg q \rightarrow \neg p$ (d) None (d)

95. Which of the following is most appropriate about software Debugging ? **(JNU-2005)**
(a) Process that shows pressence of error
(b) Process that shows the presence of error and identifying the source of error
(c) process that identifies the source of error and fixes it
(d) Process that shows the presence of error and identifying the source of error and fixes it (b)

97. If a particle is projected vertically upwards and is at height h after t_1 seconds and again t_2 seconds then its velocity of projection is **(JNU-2005)**
(a) $gt_1 t_2$ (b) $gt_1t_2/2$
(c) g ($t_1 + t$\) (d) g ($t_1 + t_2$) (c)

98. To avoid interference between channels, Bluetooth uses **(JNU-2005)**
(a) DSSS (b) FHSS
(c) Both DSSS and FHSS (d) CDMA (a)

99. $\forall p(x)$ is equivalent to **(JNU-2005)**
(a) $\exists x \neg P(x)$ (b) $\forall x \neg P(x)$
(c) $\exists P(x)$ (d) none (d)

100. For a complete graph with 7 verticles, number of splanning tree is at least **(JNU-2005)**
(a) 64 (b) 63
(c) 127 (d) 128 (c)

101. If pth, qth and rth terms of a GP are x, y, z respectively, then $x^{q-r} y^{r-p} z^{p-q}$ is equal to **(JNU-2005)**
(a) 0 (b) 1
(c) -1 (d) none (b)

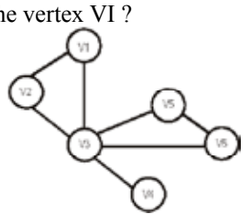
102. Which of these conditions holds for a planar graph ? **(JNU-2005)**
(a) v - e + r = 2 (b) v - r + e = 2
(c) e - v + r = 2 (d) none (d)

103. A graph G is called unicursal if and only if **(JNU-2005)**
(a) all verticales of G are of even degree
(b) all verticales are of odd degree
(c) exactly two vertices are of odd degree
(d) exactly two vertices are of od degree (a)

104. A relation that is reflexive, antisynmmetric and transitive is a/an **(JNU-2005)**
(a) function (b) equivalance
(c) partial (d) none (b)

105. If A is a symmetric matrix and $n \in N$, then A^n is **(JNU-2005)**
(a) symmetric (b) skew-symmetric
(c) a diagonal matrix (d) none of these (a)

107. In the graph given below, what will be the result of DFS starting from the vertex VI ? **(JNU-2005)**



(a) V1, V2, V3, V6, V4, V5 (b) V1, V2, V3, V5, V6, V4
(c) V1, V2, V4, V3, V5, V6 (d) V1, V2, V3, V5, V4, V6
(b)

108. If $\vec{a}, \vec{b}$ are unit vectors such that the vector $\vec{a} + 3\vec{b}$ is perpendicular to $7\vec{a} - 5\vec{b}$ and $\vec{a} - 4\vec{b}$, then the angle between $\vec{a}$ and $\vec{b}$ is : **(JNU-2005)**
(a) $\pi/6$ (b) $\pi/4$
(c) $\pi/3$ (d) $\pi/2$ (c)

109. If the product of n positive is unity, then their sum is **(JNU-2005)**
(a) a positive number (b) divisible by n'
(c) equal to n + 1/n (d) never less than n (d)

110. If $\overline{X}_1$ and $\overline{X}_2$ are the means of two distribution such that $\overline{X}_1 < \overline{X}_2$ and $\overline{X}$ is the mean of the combined distribution, then **(JNU-2005)**
(a) $\overline{X} < \overline{X}_1$ (b) $\overline{X} > \overline{X}_2$
(c) $\overline{X} = \frac{\overline{X}_1 + \overline{X}_2}{2}$ (d) $\overline{X}_1 < \overline{X} < \overline{X}_2$ (d)

111. If a matix A is such that $3A^3 + 2A^2 + 5A + I = 0$, then A-I is equal to **(JNU-2005)**
(a) -(3A + 2A² + 5I) (b) $3A^3 + 2A^2 + 5I$
(c) $3A^3 - 2A^2 - 5I$ (d) none of these (a)

113. The mean age of a combined group of men and women is 25 years. If the mean age of the group of men is 26 and that of the group of women is 21, then the percentage of men and women in the group is **(JNU-2005)**
(a) 60, 40 (b) 80, 20
(c) 20, 80 (d) 40, 60 (b)

114. A reectrant code is one **(JNU-2005)**
(a) that can midify itself (b) that cannot modify itself
(c) that is non-shared (d) none of the above (d)

115. Consider a logical address space of 8 pages of 1024 words each mapped on to physical memoty of 32 frams. How many bits are there in logical and physical addresses respectively ? **(JNU-2005)**
(a) 3 and 5 (b) 10 and 5
(c) 13 and 15 (d) 13 and 13 (a)

116. $\frac{2x}{x^3-1} = \frac{A}{x-1} + \frac{B+C}{x^2+x+1}$, then **(JNU-2005)**
(a) A = B = C (b) $A = B \neq C$
(c) $A \neq B = C$ (d) $A \neq B \neq C$ (b)

117. V.33 modem uses **(JNU-2005)**
(a) 64-QAM (b) 256-QAM
(c) 128-QAM (d) 32-QAM (c)

118. A body falling from a height of 10m rebounds from a hard floor.if it loses 20% of its energy in impact, it will rise up to
(a) 10m (b) 8m
(c) 6m
(d) 5m (b) **(JNU-2005)**

119. You have three coins in your pocket, two fair ones but the third biased with probability of heads p and tails 1- p. One coin selected at random drops to the floor, landing heads up. How likely is it is one of the fair coins ?
(JNU-2005)
(a) p (b) 1/(1 + p)
(c) 1/2
(d) none (d)

120. The cube root of unity

(JNU-2005)
(a) are collinear (b) lie on a circle of raidus $\sqrt{3}$
(c) form an equilateral triangle
(d) none of these (c)