

SAMPLE PAPER



Aakash
NATIONAL

TALENT HUNT EXAM

2012

Science & Mathematics
Mental Ability & General Knowledge



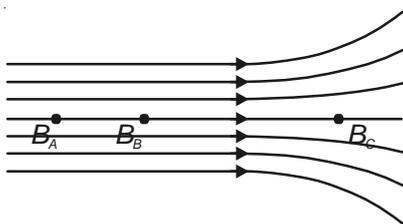
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Medical | IIT-JEE | Foundations

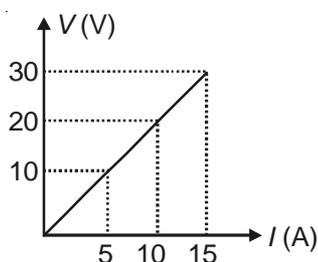
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8. The given figure shows the magnetic field pattern in a region. Which of the following is the correct relation regarding the strength of the magnetic fields B_A , B_B and B_C ?



- (1) $B_A = B_B < B_C$ (2) $B_A = B_B = B_C$
 (3) $B_A = B_B > B_C$ (4) $B_A < B_B < B_C$
9. The $V - I$ graph of a metal cube is shown in the figure. If the length of the conductor is 2 m, then resistivity of the material is



- (1) $10 \Omega\text{m}$ (2) $2 \Omega\text{m}$
 (3) $4 \Omega\text{m}$ (4) $5 \Omega\text{m}$
10. Which of the following is correct?
- (1) Magnetic force depends on the mass of charge
 (2) Magnetic force acts in the direction of current
 (3) Magnetic force does work on a moving charge
 (4) Magnetic force can accelerate a charge
11. Anode mud is formed during
- (1) Anodising (2) Electrolytic refining
 (3) Galvanization (4) Corrosion

12. If a solution turns blue litmus red, its pH is likely to be
- (1) 4 (2) 8
 (3) 10 (4) 13
13. The brown surface of copper becomes black on heating in air. When hydrogen gas is passed over this black surface, it turns
- (1) Brown (2) Green
 (3) Red (4) White
14. $3\text{MnO}_2 + b\text{Al} \longrightarrow 3\text{Mn} + a\text{Al}_2\text{O}_3 + \text{Heat}$
 The values of a and b for the above reaction are
- (1) 4, 2 respectively (2) 2, 4 respectively
 (3) 2, 2 respectively (4) 4, 3 respectively
15. During the electrolytic refining of copper, the anode is made up of
- (1) Pure copper (2) Impure copper
 (3) Graphite (4) Pure tin
16. Apart from sodium, which element among the following is kept immersed in kerosene oil?
- (1) Magnesium (2) Zinc
 (3) Potassium (4) Lead
17. How many molecules of water of crystallisation are present in one molecule of gypsum?
- (1) 10 (2) 2
 (3) $\frac{1}{2}$ (4) 5
18. Which of the following is a sulphide ore?
- (1) Haematite (2) Bauxite
 (3) Cinnabar (4) Magnetite

Space for Rough Work

19. $x\text{Pb}(\text{NO}_3)_2 \longrightarrow x\text{PbO} + y\text{NO}_2 + z\text{O}_2$
The values of x, y and z respectively are
(1) 2, 2, 4 (2) 2, 4, 1
(3) 2, 4, 2 (4) 1, 2, 1
20. If a solution turns pH paper yellow, then the pH range of the solution is
(1) 1 - 2 (2) 5 - 6
(3) 8 - 9 (4) 7 - 8
21. The cork cells become impervious to water, gases and nutrients due to the deposition of
(1) Lignin (2) Suberin
(3) Pectin (4) Oxalic acid
22. A cell organelle 'X', responsible for synthesis of proteins is produced by a structure 'Y', which is located inside another organelle 'Z'. Identify X, Y and Z.
(1) X-RER, Y-Nucleolus, Z-Mitochondria
(2) X-RER, Y-Golgi apparatus, Z-Nucleus
(3) X-Nucleolus, Y-Nucleus, Z-RER
(4) X-Ribosome, Y-Nucleolus, Z-Nucleus
23. Which of the following elements is necessary to prevent goitre?
(1) Calcium (2) Iron
(3) Iodine (4) Copper
24. Which of the following is incorrect?
(1) Vena cava carries deoxygenated blood
(2) Nephron is the basic filtration unit of kidneys
(3) Bile juice is stored in the gall bladder
(4) Both kidneys are present in the pelvic region at the same height
25. The initiating step in photosynthesis is the
(1) Formation of ATP and NADPH
(2) Reduction of carbon dioxide to glucose
(3) Photolysis of water
(4) Absorption of light energy by chlorophyll
26. Stomatal pores open, when the guard cells
(1) Swell up due to endosmosis
(2) Shrink due to exosmosis
(3) Swell up due to exosmosis
(4) Shrink due to endosmosis
27. The very first enzyme to act on starch, present in food, is secreted by
(1) Pancreas (2) Gastric glands
(3) Small intestine (4) Salivary glands
28. Sphygmomanometer reading of a patient as mentioned by a doctor is 140/60. 140 and 60 represent
(1) Normal systolic and diastolic pressure
(2) Abnormal systolic and diastolic pressure
(3) Normal systolic and abnormal diastolic pressure
(4) Abnormal systolic and normal diastolic pressure
29. The contraceptive device copper-T, is placed in the
(1) Vagina (2) Uterus
(3) Ovary (4) Fallopian tube
30. Which part of the brain is damaged if a person is unable to maintain the balance and posture of his body?
(1) Cerebrum (2) Medulla
(3) Cerebellum (4) Pons

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SECTION - B : MATHEMATICS

31. If k , l and m are the zeroes of the polynomial $6x^3 + 5x^2 + 4x - 1$, then the value of $k^{-1} + l^{-1} + m^{-1}$ is
- (1) $\frac{-1}{4}$ (2) $\frac{5}{6}$
 (3) $\frac{4}{6}$ (4) 4
32. Mohit textiles marks their clothes up by 60% subsequently offering a discount of 30%. The net profit made by them after offering the discount is
- (1) 7.5% (2) 10%
 (3) 12% (4) 15%
33. If $(1 + \cot A - \operatorname{cosec} A)(1 + \tan A + \sec A) = 2x^2$, then the possible value of x is
- (1) 0 (2) $\frac{1}{\sqrt{2}}$
 (3) 1 (4) 2
34. In an equilateral triangle ABC , D is a point on side BC such that $BD = \frac{1}{4}BC$. The ratio of AD^2 and AB^2 is
- (1) 11 : 16 (2) 7 : 9
 (3) 9 : 16 (4) 13 : 16
35. The number of different positive integers lying between 10^{15} and 10^{16} , the sum of whose digits is equal to 2 is
- (1) 16 (2) 24
 (3) 36 (4) 64
36. For getting a 'less than' Ogive, we plot the graph of
- (1) Cumulative frequency with upper limits
 (2) Cumulative frequency with lower limits
 (3) Cumulative frequency with classmark
 (4) Cumulative frequency with range
37. What percent of 15 is 15 percent of 1?
- (1) 0.01 (2) 0.001
 (3) 0.0001 (4) 1
38. The number of integral divisors of 720 is
- (1) 15 (2) 20
 (3) 25 (4) 30
39. The average weight of Anil, Mohan and Sohan is 45 kg. If the average weight of Anil and Mohan is 40 kg and that of Mohan and Sohan is 43 kg, then the weight of Mohan is
- (1) 31 kg (2) 34 kg
 (3) 35 kg (4) 38 kg
40. In an acute angled $\triangle ABC$, if $\sin(A + B - C) = \frac{\sqrt{3}}{2}$, then angle C is equal to
- (1) 30° (2) 45°
 (3) 60° (4) 90°
41. If a five digit number is written as $pqrst$, then the difference of $pqrst$ and $prstq$ will always be divisible by
- (1) 9 (2) 18
 (3) 45 (4) All of these
42. HCF of three numbers taken pairwise is 2. If the LCM of the three numbers is 59976, then the product of the three numbers taken together is
- (1) 2592 (2) 46656
 (3) 31426 (4) 239904
43. The average of n non-zero numbers is zero. Out of them at least, how many numbers may be greater than zero?
- (1) 0 (2) 1
 (3) $n/2$ (4) $n - 1$

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44. If a and b are the zeroes of the polynomial $f(x) = x^2 - 6x + 8$, then the value of $\frac{a^{-1} + b^{-1}}{a^{-1}} + \frac{a^{-1} - b^{-1}}{b^{-1}}$ is
- (1) $\frac{3}{2}$ (2) $\frac{5}{2}$
 (3) 5 (4) $\frac{10}{3}$
45. Two ogives for a particular data, one 'less than' type and other 'more than' type, intersect each other at a point $P(a, b)$. The value of b is
- (1) Median of the data
 (2) Frequency of the data
 (3) Half the frequency of the data
 (4) Half the median of the data
46. Which of the following can be the HCF and LCM of two numbers?
- (1) HCF = 15, LCM = 155
 (2) HCF = 24, LCM = 1008
 (3) HCF = 24, LCM = 252
 (4) HCF = 22, LCM = 422
47. If $\cos\theta + \sin\theta = \sqrt{2}\cos\theta$, then $\cos\theta - \sin\theta$ is equal to
- (1) $\sqrt{2}$ (2) $\sqrt{2}\sin\theta$
 (3) $\sqrt{2}\tan\theta$ (4) $\sqrt{2}\cot\theta$
48. If X axis and Y axis form two triangles Δ_1 and Δ_2 with lines $3x + y = 3$ and $2x + y = 7$ respectively, then the ratio of areas of Δ_1 to Δ_2 is
- (1) 7 : 3 (2) 6 : 7
 (3) 6 : 49 (4) 36 : 7
49. If $f(x)$ is a quadratic polynomial such that $f(2) = -3$ and $f(-2) = 21$, then the coefficient of x in $f(x)$ is
- (1) 4 (2) 7
 (3) -6 (4) -3
50. $ABCD$ is a rectangle in which $AB = 2AD$. P and Q are mid-points of AD and AB respectively. If BP and DQ intersect at R , then the ratio of the area of quad $BRDC$ and $\text{ar}(\Delta BAP)$
- (1) 1 : 5 (2) 4 : 2
 (3) 8 : 3 (4) 7 : 2
51. If $0 < \theta < 90^\circ$, $\sin\theta + \cos\theta = p$ and $q = \frac{2p}{p^2 - 1}$, then q is equal to
- (1) $\sin\theta - \cos\theta$ (2) $\cos\theta + \sec\theta$
 (3) $\sec\theta + \text{cosec}\theta$ (4) $\text{cosec}\theta - \cos\theta$
52. $ABCD$ is a trapezium. If diagonals AC and BD intersect at O such that perimeter of $\Delta AOB = 30$ cm and perimeter of $\Delta COD = 15$ cm, then $\frac{\text{ar}(\Delta AOB)}{\text{ar}(\Delta COD)}$ is
- (1) 2 : 1 (2) 1 : 2
 (3) 4 : 1 (4) 1 : 4
53. If $A + B = \frac{\pi}{2}$, then $(\tan A + 1)(\tan B + 1)$ is equal to
- (1) $\text{cosec}A \sec A$
 (2) $2 + \text{cosec}A + \sec A$
 (3) $2 \text{cosec}A \sec A$
 (4) $2 + \text{cosec}A \sec A$

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54. The value of $\sqrt{\frac{\sec \theta - 1}{\sec \theta + 1}} + \sqrt{\frac{\sec \theta + 1}{\sec \theta - 1}}$ is
- (1) $2/\operatorname{cosec} \theta$ (2) $\operatorname{cosec} \theta$
 (3) $2\operatorname{cosec} \theta$ (4) $\sin \theta$
55. If a person sold his watch for Rs. 144 and got a percentage of profit equal to the cost price, then the cost price of the watch is
- (1) Rs. 80 (2) Rs. 88
 (3) Rs. 84 (4) Rs. 83
56. If $x + y = 1$, then the value of $x^3 + y^3 + 3xy$ is
- (1) 1 (2) 0
 (3) 2 (4) 3
57. If a certain number divides $2^{32} + 1$, then which of the following is also divisible by the same number?
- (1) $2^{96} + 1$ (2) $2^{16} - 1$
 (3) $2^{16} + 1$ (4) 7×2^{33}
58. If $p + \frac{1}{p} = q$, then for $p > 0$
- (1) $q = 0$
 (2) $q \geq 0$
 (3) $-2 < q < 2$
 (4) $q \leq -2$
59. If ABC is a triangle right angled at B and M, N are the mid-points of AB and BC , then $4(AN^2 + CM^2)$ is equal to
- (1) $4 AC^2$ (2) $5 AC^2$
 (3) $6 AC^2$ (4) AC^2
60. The ratio of inradius to the circumradius of an equilateral triangle is
- (1) 1 : 2 (2) $1 : \sqrt{2}$
 (3) 2 : 5 (4) $\sqrt{2} : \sqrt{3}$

Part - II

Mental Ability & General Knowledge

SECTION - A : MENTAL ABILITY

This section contains 40 multiple choice questions numbered 61 to 100. Each question has 4 choices (1), (2), (3) and (4), out of which **ONLY ONE** is correct.

61. If LADI is coded as 52, then TERG is coded as
- (1) 100 (2) 50
 (3) 25 (4) 75
62. If the day before yesterday was Sunday, then when will Friday be?
- (1) Two days after today (2) Three days after today
 (3) Tomorrow (4) Day after tomorrow
63. Which is the incorrect number in the following sequence?
 2, 5, 10, 18, 26, 37, 50
- (1) 18 (2) 26
 (3) 37 (4) 50
64. If SITA is coded as UGVY, then MONK is coded as
- (1) OMLI (2) OMPI
 (3) OKLI (4) OMKI

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65. If JAIPOR is coded as 019658, then PIAJRO is coded as

- (1) 690185
 (2) 691805
 (3) 691080
 (4) 691085

66. In a certain code, "Beautiful I peacock saw" is given by "ACDE", "girl beautiful nature" is given by "AFB", "worship saw peacock" is given by "GEC" and "Saw I beautiful" is given by "EDA". Which of the following is the code for "Peacock I beautiful"?

- (1) AEG (2) GAE
 (3) GDA (4) CDA

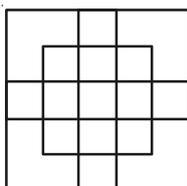
67. A clock is showing 3:30 pm. If at that instant, the minute hand of the clock is pointing in the North-East direction, then the hour hand is pointing towards

- (1) North (2) West
 (3) North-West (4) South-West

68. In a row of trees, a tree is the fifteenth from either end of the row. How many trees are there in the row?

- (1) 28 (2) 29
 (3) 30 (4) 31

69. How many squares does the following figure contain?



- (1) 17 (2) 19
 (3) 21 (4) 27

Directions (Q.70 & Q.71) :

- (i) $P + Q$ means P is the son of Q
 (ii) $P - Q$ means P is the wife of Q
 (iii) $P \times Q$ means P is the brother of Q
 (iv) $P \div Q$ means P is the mother of Q
 (v) $P = Q$ means P is the sister of Q

70. What does $A + C - B$ mean?

- (1) B is the father of A
 (2) B is the son of A
 (3) B is the uncle of A
 (4) B is the brother of A

71. What does $A = C + B$ mean?

- (1) A is the aunt of B
 (2) A is the daughter of B
 (3) A is the niece of B
 (4) A is the sister of B

72. If A is 60 m South-West of B and C is 60 m South-East of the B, then C is in which direction w.r.t. A?

- (1) East (2) West
 (3) North-East (4) South

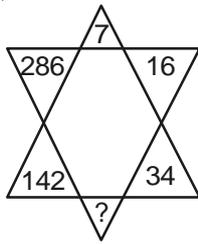
73. In the following number sequence, how many such even numbers are there which are exactly divisible by their immediate preceding number but not exactly divisible by their immediate following number?

4 7 8 2 6 7 9 3 6 5 0 2 4 6 8 1

- (1) 0 (2) 2
 (3) 3 (4) 1

Space for Rough Work

80. Find the missing number.



- (1) 68 (2) 70
(3) 66 (4) 62

Directions (Q.81 & Q.82) : Insert the correct missing number from the choices given below :

81.

3	4	5
6	7	8
7	8	9
39	52	?

- (1) 61 (2) 67
(3) 72 (4) 84

82.

2	4	6
3	5	?
8	24	54

- (1) 7 (2) 8
(3) 9 (4) 12

83. Weaver : Cotton :: Tailor : ?

- (1) Fibre (2) Thread
(3) Clothes (4) Food

84. DTP : FWT :: STD : ?

- (1) UWH (2) VWI
(3) UVE (4) UWF

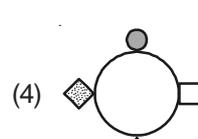
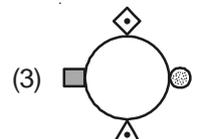
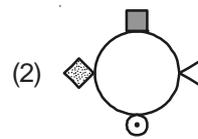
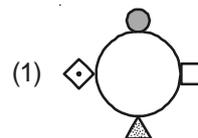
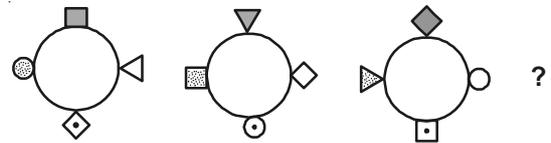
85. How many such pairs of letters are there in the word 'PRAKASHAN' each of which have as many letters between them as in the English Alphabet?

- (1) None (2) One
(3) Two (4) Three

86. Find the odd one out.

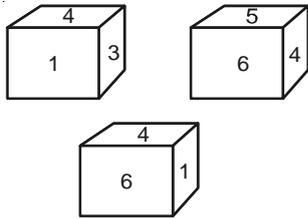
- (1) Mango (2) Banana
(3) Apple (4) Carrot

87. Complete the series.



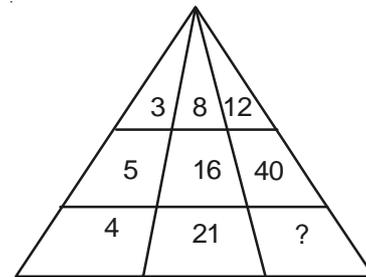
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Directions (Q.88 to Q.90) : Given below are three positions of the same cube having numbers 1 to 6 written on its six faces. Answer questions 88 to 90 after a careful study of the three positions of the cube.



88. Which number is on the face opposite to 6?
 (1) 2 (2) 3
 (3) 4 (4) 1
89. The bottom face in the first figure is numbered
 (1) 6 (2) 2
 (3) 5 (4) 1
90. The number on the face opposite to 1 is
 (1) 5 (2) 4
 (3) 6 (4) 3
91. A and B can do a piece of work in 9 days, B and C can do it in 12 days and A and C can do it in 18 days. If A, B and C work together, then the work would be finished in
 (1) 6 days (2) 7 days
 (3) 8 days (4) 4 days
92. A clock is correctly set at 8 a.m. The clock gains 10 minutes in 24 hours. When the clock indicates 3 p.m. on the following day, the actual time is
 (1) 2:50 p.m. (2) 3:10 p.m.
 (3) 2:48 p.m. (4) 2:40 p.m.

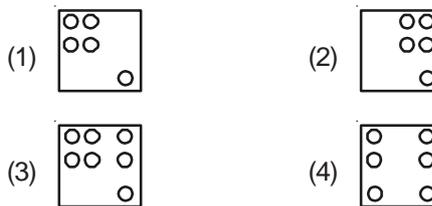
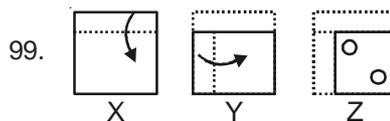
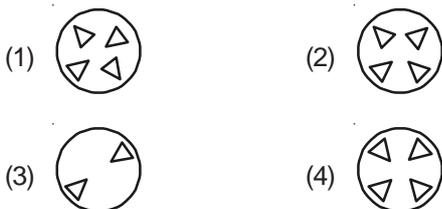
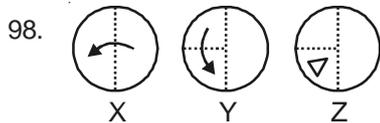
93. The missing value in given arrangement is



- (1) 50 (2) 52
 (3) 42 (4) 36
94. Find the missing number.
 15, 25, 40, 65, ?, 195
 (1) 115 (2) 110
 (3) 90 (4) 105
95. Four girls are sitting on a bench to be photographed. Shikha is to the left of Pinky. Manisha is to the right of Pinky. Anu is between Pinky and Manisha. Who would be second from right in the photograph?
 (1) Manisha (2) Pinky
 (3) Shikha (4) Anu
96. If in a certain language: white is called blue, blue is called red, red is called yellow, yellow is called green, green is called black, black is called violet, and violet is called orange. What would be the colour of human blood in that language?
 (1) Red (2) Green
 (3) Yellow (4) Blue
97. If 'p' stands for division, 'q' for multiplication, 'r' for addition and 's' for subtraction, then the value of $18p6q3r2s15p3$ is
 (1) 15 (2) 11
 (3) 8 (4) 6

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Directions (Q.98 to Q.99) : These questions follow a set of three figures X, Y and Z showing a sequence of folding of a piece of paper. Z shows the manner in which the folder paper has been cut. These three figures are followed by the four answer figures. Out of these four you have to choose a figure which would most closely resemble the unfolded form of Z.



100. Having reached the place of meeting 20 minutes before 6:30 p.m., Prachi found herself 55 minutes earlier than the scheduled time. What was the scheduled time of meeting?

- (1) 7:00 p.m. (2) 7:05 p.m.
(3) 7:15 p.m. (4) 7:25 p.m.

SECTION - B : GENERAL KNOWLEDGE

This section contains 20 multiple choice questions numbered 101 to 120. Each question has 4 choices (1), (2), (3) and (4), out of which **ONLY ONE** is correct.

101. Where is the National Physical Laboratory located?
(1) Ahmedabad (2) Pune
(3) New Delhi (4) Lucknow
102. Which canal connects the Mediterranean Sea to the Red Sea?
(1) Erie Canal (2) Indira Gandhi Canal
(3) Panama Canal (4) Suez Canal
103. Who was the last Mughal emperor of India?
(1) Nadir Shah
(2) Aurangzeb
(3) Bahadurshah Zafar
(4) Jehangir

104. The Parliament of USA is known as
(1) Federal Assembly (2) Diet
(3) Knesset (4) Congress
105. Kourou city is well known for
(1) Port facilities
(2) Racial problems
(3) Satellite launching
(4) Volcanic eruptions
106. Man passed from the food-gathering stage to the food-producing stage in the
(1) Paleolithic age (2) Neolithic age
(3) Chalcolithic age (4) Mesolithic age

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107. "Satyameva Jayate" has been taken from
 (1) Mundak upanishad
 (2) Rig veda
 (3) Katho upanishad
 (4) Atharva veda
108. The forest area known as 'silent valley' is in
 (1) Kerala (2) Uttarakhand
 (3) Nagaland (4) Karnataka
109. Martyrs' day is celebrated on
 (1) 24 January (2) 26 January
 (3) 28 January (4) 30 January
110. Angkor Wat temples are found in
 (1) Nilgiri Hills (2) Belgium
 (3) Cambodia (4) Palestine
111. The outermost layer of the Sun is
 (1) Corona (2) Lithosphere
 (3) Medulla (4) Photosphere
112. Who is called the 'Father of Indian Cinema'?
 (1) Ramanand Sagar (2) Amitabh Bachchan
 (3) Dada Saheb Phalke (4) Prithviraj Kapoor
113. When is the Independence day of Pakistan celebrated?
 (1) January 25 (2) August 14
 (3) August 15 (4) August 16
114. During the British era, which city was the capital of India before Delhi?
 (1) Patna (2) Lucknow
 (3) Calcutta (4) Bombay
115. Bismillah Khan was a legendary _____ Maestro.
 (1) Sitar (2) Shehnai
 (3) Tabla (4) Bansuri
116. Our national anthem was first sung in the year
 (1) 1911 (2) 1913
 (3) 1936 (4) 1935
117. The author of book "The Discovery of India" is
 (1) B.R. Ambedkar (2) Mahatma Gandhi
 (3) J.L. Nehru (4) S.C. Bose
118. Which Greek goddess of victory is depicted on the Olympic medals?
 (1) Athena (2) Aphrodite
 (3) Nike (4) Hera
119. The first Indian to win an individual Olympic gold medal is
 (1) Vijender Singh
 (2) Rajyavardhan Singh Rathore
 (3) Abhinav Bindra
 (4) Khashaba Jadav
120. Who won the first Indian Grand prix Formula One world championship?
 (1) Jenson Button (2) Mark Webber
 (3) Michael Schumacher (4) Sebastian Vettel



Space for Rough Work

**OUR RESULTS OF
ENGINEERING
& MEDICAL 2012**

IIT-JEE 2012

1007

AIEEE 2012

1880

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1120



800^{*} students across India shall be awarded
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