



(Powered by Eureka Science Academy)

Test Booklet Code

**E4**

## Aptitude Cum Scholarship Test

Q. No.	Subject	Nature of Questions	No. of Questions	Marks	Negative	Total
1 to 20	<b>SECTION - I</b>	MCQ	20	+ 4	0	80
	<b>MENTAL ABILITY</b>					
21 to 40	<b>SECTION - II</b>		20	+ 4	0	80
	<b>SCIENCE</b>					
41 to 60	<b>SECTION - III</b>		20	+ 4	0	80
	<b>MATHEMATICS</b>					
<b>TOTAL</b>				<b>TOTAL</b>	<b>240</b>	

### Important Instructions:

1. The test is of 1 hours 30 min duration and Test Booklet contains 60 questions. Each question carries 4 marks. For each correct response, the candidate will get 4 marks. For each incorrect response Zero marks. The maximum marks are 180.
2. Use Blue/Black Ball point Pen only for writing particulars on this page/marking responses.
3. Rough work is to be done on the space provided for this purpose in the Test Booklet only.
4. On completion of the test, the candidate must hand over the Answer Sheet to the Invigilator before leaving the Room/ Hall. *The candidates are allowed to take away this Test Booklet with them.*
5. The CODE for this Booklet is E4.
6. The candidates should ensure that the Answer Sheet is not folded. Do not make any stray marks on the Answer Sheet. Do not write your Roll No. anywhere else except in the specified space in the Test Booklet/Answer Sheet.
7. Each candidate must show on demand his/her Admission Card to the Invigilator.
8. No candidate, without special permission of the Superintendent or Invigilator, would leave his/her seat.
9. Use of Electronic/Manual Calculator is prohibited.
10. The candidates are governed by all Rules and Regulations of the examination with regard to their conduct in the Examination Hall. All cases of unfair means will be dealt with as per Rules and Regulations of this examination.
11. No part of the Test Book let and Answer Sheet shall be detached under any circumstances.
12. The candidates will write the Correct Test Booklet Code as given in the Test Booklet / Answer Sheet in the Attendance Sheet.

## **Section - I : MENTAL ABILITY**

- ❖ **Q.No. 1 to Q.No. 20 Single correct answer type: In this type there is only one correct answer.**  
**Choose only one option for an answer : (Correct Answer : +4, Wrong Answer : 0, Unattempted: 0)**

**Direction for question 1 to 4 :** Find missing number of the following series question.

1. 4, 16, 36, \_\_\_\_, 100  
(A) 48 (B) 64 (C) 72 (D) 88
2. 1, 8, 27, 64, \_\_\_\_, 216  
(A) 72 (B) 81 (C) 144 (D) 125
3. 3, 15, 35, 63, \_\_\_\_  
(A) 99 (B) 89 (C) 88 (D) 101
4. 2, 8, 18, 32, \_\_\_\_  
(A) 48 (B) 52 (C) 50 (D) 64

**Direction for question 5 to 8 :** Each question of two words which have certain relationship to each other followed by four pair of related words. Select the pair which has the same relationship.

5. After : Before  
(A) First : Second (B) Present : Past  
(C) Contemporary : historic (D) Successor : Predecessor
6. Light : Blind  
(A) speak : dumb (B) tongue : sound (C) voice : vibration (D) language : deaf
7. Ten : Decimal  
(A) Four : Quartet (B) Two : Binary (C) Five : Quince (D) Seven : Septet
8. Pork : Pig  
(A) Rooster : Chicken (B) Fish : Beef  
(C) Mutton : Sheep (D) Lobster : Beef
9. If in a certain language BEST is coded as DGUV, then DELHI codes as :  
(A) E G N J K (B) E F M I J (C) F G N J L (D) None of these
10. If BOMBAY is written as MYMYMY, then 'TAMILNADU' can be written as  
(A) ALDALD ALD (B) MNU MNU MNU (C) TLU TLU TLU (D) None of these
11. Choose the word which is different from rest  
(A) Cap (B) Turban (C) Hat (D) Veil
12. Choose the word which is different from the rest  
(A) Kiwi (B) Eagle (C) Emu (D) Ostrich

**Direction for question 13 to 14 :** Find missing value in the following questions.

13.

2	8	68
3	11	130
5	?	50

- (A) 4                                      (B) 5                                      (C) 8                                      (D) 10

14.

●	●	●
●	○	●
●	●	?

- (A) ●                                      (B) ●                                      (C) ●                                      (D) ●

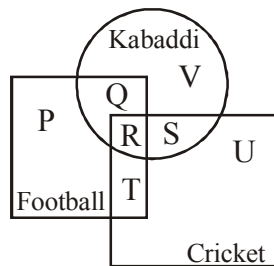
15. A number of friends decided a party and planned to spend Rs. 96 on eatables. Four of them, however did not turn up. As a consequence the remaining had to contribute Rs. 4 each extra. The number of those who attended the party was :

- (A) 12                                      (B) 8                                      (C) 16                                      (D) 20

16. I have a few pens to distribute. If i distribute 2 or 3 or 4 pens to each, then I am left with one pen, but if i distribute 5 each, then I am left with none. What is the minimum number pens i have to distribute?

- (A) 15                                      (B) 20                                      (C) 25                                      (D) 30

\* **Direction for question 17 and 18 :** The diagram given below represent those students who play Cricket, Football and Kabaddi. Study the diagram and identify the students who play



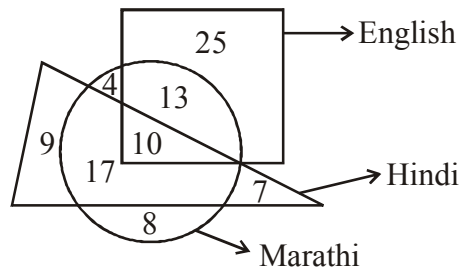
17. All three games

- (A) Q + R                                      (B) R + S                                      (C) R + T                                      (D) R

18. Football and Cricket but not kabaddi

- (A) R + S + T                                      (B) R + T                                      (C) T                                      (D) P + T + U

\* **Direction for question 19 and 20 :** In the following figure square represent the persons who know English, triangle to those know Hindi, circle those know Marathi.



19. How many can speak both English and Hindi only ?  
(A) 41                      (B) 13                      (C) 10                      (D) None
20. How many can speak both Hindi and Marathi only ?  
(A) 27                      (B) 17                      (C) 25                      (D) None of these

## Section - II : SCIENCE

- ❖ *Q.No. 21 to Q.No. 30 Single correct answer type: In this type there is only one correct answer. Choose only one option for an answer : (Correct Answer : +4, Wrong Answer : 0, Unattempted: 0)*
21. A car starting from rest traveling along a straight path with uniform acceleration covers  $S_1$ ,  $S_2$  and  $S_3$  distances in the first, second and third seconds of its travel. Then the ratio of  $\frac{(S_2 - S_1)}{(S_3 - S_2)}$  is \_\_\_\_\_.  
(A) 3 : 5                      (B) 1 : 2                      (C) 1 : 3                      (D) 1 : 1
22. A man of mass 65 kg is holding a bucket of mass 15 kg. He walks 50 m on a level road at a constant speed 3 m/s and then climbs up a hill of height 20 m. What is the work done by the man ?  
(A) 2.05 KJ                      (B) 3.5 KJ                      (C) 12 KJ                      (D) 16 KJ
23. The bob of an oscillating simple pendulum arrives at one of the extreme positions 100 times in 200 sec, then the time period of the pendulum is \_\_\_\_\_ s  
(A) 2.5                      (B) 2                      (C) 1.5                      (D) 1
24. The electrical energy consumed by a 30 W bulb in 5 minutes is \_\_\_\_\_  
(A) 9000 KJ                      (B) 9 KJ                      (C) 9000 MJ                      (D) 9 MJ
25. The postulates of Bohr's atomic model is given below. Arrange them in the correct sequence.  
(I) As long as the electron revolves in a particular orbit, the electron does not lose its energy. Therefore, these orbits are called stationary orbits and the electrons are said to be in stationary energy states  
(II) Electrons revolve round the nucleus in specified circular paths called orbits or shells  
(III) The energy associated with a certain energy level increases with the increase of its distance from the nucleus  
(IV) An electron jumps from a lower energy level to a higher energy level by absorbing energy. But when it jumps from a higher to lower energy level, energy is emitted in the form of electromagnetic radiation  
(V) Each orbit or shell is associated with a definite amount of energy. Hence these are also called energy levels and are designated as K, L, M, N respectively  
(A) II → V → III → I → IV                      (B) V → III → II → IV → I  
(C) III → I → II → IV → V                      (D) V → I → III → IV → II
26. Excess intake of  $O_2$  by a person results in several ill-effects. Which of the following activities leads to excess intake of  $O_2$  ?  
(A) Deep sea diving                      (B) Mountaineering  
(C) Travelling in an aeroplane                      (D) Walking on the moon
27. Non-stick teflon coated cookwares are generally recommended to heart patients because  
(A) non-stick cookwares do not absorb water                      (B) non-stick cookwares do not absorb oil  
(C) non-stick cookwares cook faster                      (D) non-stick cookwares are biodegradable
28. Which cell organelle plays a crucial role in detoxifying many poisons and drugs in a cell?  
(A) Golgi apparatus                      (B) Lysosomes  
(C) Smooth endoplasmic reticulum                      (D) Vacuoles

29. The fungal disease causing maximum death of poultry bird is  
(A) coryza (B) pollorum (C) rickets (D) aspergillosis

30. Which of the following is a secondary pollutant  
(A) PAN (B) particulate matter  
(C) hydrocarbons (D) chlorofluorocarbons

❖ ***Q.No. 31 to Q.No. 35 Multiple correct answer type: In this type there are one or more than one correct answer. Marks will be awarded only if all the correct options are marked.***

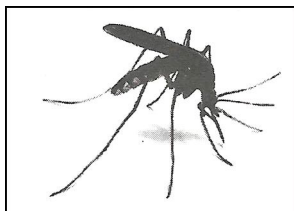
**(Correct Answer : +4, Wrong Answer : 0)**

31. Action and reaction  
(A) always act on two different objects (B) are equal in magnitude  
(C) are opposite in direction (D) cancel out each other

32. Mark the correct statements w.r.t a concave spherical mirror,  
(A) For real extended object, it can form a diminished virtual image  
(B) For real extended object, it can form a magnified virtual image  
(C) For a virtual extended object, it can form a diminished real image  
(D) For a virtual extended object, it can form a magnified real image

33. Basicity of \_\_\_\_\_ is 1  
(A) HCl (B) HNO<sub>3</sub> (C) H<sub>2</sub>SO<sub>4</sub> (D) HClO<sub>4</sub>

34. Which of the following options consisting of diseases are not transmitted by the vector shown in the figure?



Malaria, Yellow fever, Typhoid, Cholera, Dengue

(A) Typhoid (B) Dengue and Malaria  
(C) Cholera (B) Yellow fever

35. Cutting down forest and using the land for other purposes is known as deforestation. It has adverse effects on the environment. Which of the following are correct regarding these effects?

(i) Decrease in soil erosion.  
(ii) Increase in temperature  
(iii) Ground water level gets lowered  
(iv) Drought and floods.  
(v) Increase in water holding capacity of the soil.  
(A) (i), (ii) (B) (ii) and (iv)  
(C) (v) only (D) (iii) and (iv)

- ❖ **Q.No. 36 Matrix Match Type:** In this type statements are given in 2 columns which have to be matched. The statements in Column – I are labeled with choices A, B, C and D, while the statements in Column- II are labeled with choices p,q,r,s and t. For each option in column-I, there is only one correct option available in column-II :

(Correct Answer : + 1.25 marks for each correct match, Wrong Answer : 0)

36. Column – I	Column – II
(A) $v^2 - u^2$	(p) Decreases potential energy
(B) Work done	(q) Increase in wavelength
(C) Current flowing through a conductor	(r) KWh
(D) Velocity of light decreases when light travels from air to glass	(s) 2 as
	(t) at

- ❖ **Q.No. 37 to Q.No. 40 Integer type:** The answer to each question is an integer ranging from 0 to 9 :  
(Correct Answer : +4, Wrong Answer : 0)

37. The area of cross-section of a board pin needle was  $10^{-6} \text{ m}^2$ . A force of 10 N was applied to press the pin on the board. The pressure exerted by the needle pin on the board was  $1 \times 10^x \text{ Pa}$ . The value of x then is
38. A certain force was applied to  $1 \text{ cm}^2$  area of cross section to give a pressure of  $10^5 \text{ Pa}$ . If the same force is applied to a  $1 \text{ m}^2$  area, then the pressure become  $1 \times 10^x \text{ Pa}$ . The value of 'x' then is
39. Number of unsaturated hydrocarbons out of the following is  
 $\text{C}_3\text{H}_8, \text{C}_3\text{H}_6, \text{C}_2\text{H}_2, \text{CH}_4, \text{C}_3\text{H}_4, \text{C}_4\text{H}_{10}, \text{C}_2\text{H}_6, \text{C}_2\text{H}_4$
40. How many of the following metals on reacting with sodium hydroxide solution produce hydrogen gas ?  
Cu, Al, Fe, Zn

### **Section - III : MATHEMATICS**

❖ *Q.No. 41 to Q.No. 50 Single correct answer type: In this type there is only one correct answer. Choose only one option for an answer : (Correct Answer : +4, Wrong Answer : 0, Unattempted: 0)*

41. If  $x = \frac{1}{5+2\sqrt{6}}$ , then  $x^2 - 10x + 1 =$  \_\_\_\_

- (A) 1 (B) -1 (C) 0 (D) 10

42. If  $A = \{1, 2, 3, 4\}$ , then how many subsets of A contain the element 3?

- (A) 24 (B) 28 (C) 8 (D) 16

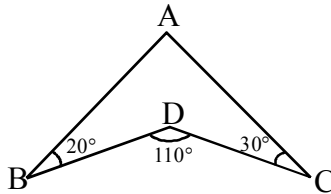
43.  $\log(x) - \log(2x - 3) = 1$ , Then  $x =$  \_\_\_\_

- (A) 30/19 (B) 20/19 (C) 19/30 (D) 19/20

44. The least positive integer x, which satisfies  $|x - 2| > 7$ ?

- (A) 9 (B) 10 (C) 7 (D) 5

45. In the figure,  $\angle ABD = 20^\circ$ ,  $\angle BDC = 110^\circ$  and  $\angle DCA = 30^\circ$ . What is the value of  $\angle BAC$ ?



- (A)  $30^\circ$  (B)  $60^\circ$  (C)  $90^\circ$  (D)  $120^\circ$

46. At the most, how many cakes of soap dimensions  $8\text{ cm} \times 6\text{ cm} \times 4\text{ cm}$  can be placed in a wooden box of inner measures  $28\text{ cm} \times 16\text{ cm} \times 12\text{ cm}$ ?

- (A) 35 (B) 24 (C) 28 (D) 36

47. The mean of the following data is 9. Find the value of a.

x	2	4	5	8	a
f	3	1	6	4	6

- (A) 12 (B) 10 (C) 9 (D) 18

48. Factors of  $x^4 - (x - z)^4$  is

- (A)  $2x + z$  (B)  $x + 2z$  (C)  $2x - z$  (D)  $z + 1$

49. If  $(x + 2)$ ,  $(x^2 + 4)$  are length and breadth of a rectangle respectively, then the area will be \_\_\_\_

- (A)  $x^3 + 2x^2 + 4x + 8$  (B)  $x^3 + 4x^2 + x + 8$  (C)  $x^3 + 8$  (D)  $x^3 + x^2 + 8x + 4$

50. Given that the number, 1735538A36 is divisible by 3, where A is a digit, what are the possible value of A?

- (A) 6 (B) 5 (C) 4 (D) 3



❖ **Q.No. 51 to Q.No. 55 Multiple correct answer type: In this type there are one or more than one correct answer. Marks will be awarded only if all the correct options are marked.**

**(Correct Answer : +4, Wrong Answer : 0)**

51. If  $\log_3 |x-2| = 2$  then the value of  $x$  is  
 (A) 11 (B) 7 (C) -7 (D) -6
52. In the given figure, ABCD is a cyclic quadrilateral  $\angle DAB = 50^\circ$  and  $\angle ABC = 80^\circ$ , EG and FG are angle bisectors of  $\angle DEC$  and  $\angle BFC$ . then  
 (A)  $\angle FHG = 75^\circ$  (B)  $\angle DHE = 75^\circ$  (C)  $\angle DEH = 25^\circ$  (D)  $\angle DEH = 40^\circ$
53. There are a total 70 ladies who watch at least one of the channels i.e., Zee TV, Sony TV and Star Plus. The total number of ladies who watch Zee TV or Sony TV but not star plus, the number of ladies who watch sony or star plus but not zee and the number of ladies who watch star plus or zee but not sony is 90. If 10 ladies watch all the three channels then  
 (A) Number of ladies who watch at least two of these channels are 40.  
 (B) Number of ladies who watch exactly one channel are 30.  
 (C) Number of ladies who watch at least two of these channels are 50.  
 (D) Number of ladies who watch exactly one channels are 40.
54. If  $a+b=11$  and  $ab=30$ , then find the value of  $(a-b)$   
 (A) 1 (B) -1 (C) -2 (D) 2
55. A relation  $R : Z \longrightarrow Z$  defined by  $R = \{(x, y) / y = x^2 - 1\}$  is  
 (A) Many to one relation (B) Into relation  
 (C) One to many relation (D) One to One relation

❖ **Q.No.56 Matrix Match Type: In this type statements are given in 2 columns which have to be matched. The statements in Column - I are labeled with choices A, B, C and D, while the statements in Column- II are labeled with choices p,q,r,s and t. For each option in column-I, there is only one correct option available in column-II :**

**(Correct Answer : + 4 marks for each correct match, Wrong Answer : 0)**

- | 56. Column - I   | Column -II |
|--|------------|
| (A) The area of triangle (in sq. m <sup>2</sup> ) whose base is 24 cm and whose altitude is 15 cm is                                     | (p) 11     |
| (B) The diameter of a wheel is 1.26 m. How far will it travel in 500 revolutions in meters?  | (q) 34650  |
| (C) The height (in cm) of a cuboid where volume is 275 cm <sup>3</sup> and base area is 25 cm <sup>2</sup> is                            | (r) 180    |
| (D) The circumference of the base of the cylinder is 132 cm and its height is 25 cm. The volume of the cylinder (in cm <sup>3</sup> ) is | (s) 1980   |
|  | (t) 3000   |

❖ **Q.No. 57 to Q.No. 60 Integer type: The answer to each question is an integer ranging from 0 to 9**  
**:(Correct Answer : +4, Wrong Answer : 0)**

57. If  $x = \frac{1}{2 - \sqrt{3}}$ , then the value of  $x^3 - 2x^2 - 7x + 10$  is equal to

58. If  $A = \left\{ p \in N, p \text{ is a prime and } p = \frac{7n^2 + 3n + 3}{n} \text{ for some } n \in N \right\}$ , then the number of elements in the set A is

59. If  $\frac{3}{2}x + 2y = \frac{x}{4} - \frac{y}{2} = 1$ , then  $x - y =$

60. If  $x + \frac{1}{x} = 3$ , then  $x^2 + \frac{1}{x^2} =$

## ANSWER KEY

### MENTAL ABILITY

- |         |         |         |         |         |
|---------|---------|---------|---------|---------|
| 1. (B)  | 2. (D)  | 3. (A)  | 4. (C)  | 5. (D)  |
| 6. (A)  | 7. (B)  | 8. (C)  | 9. (C)  | 10. (B) |
| 11. (D) | 12. (B) | 13. (B) | 14. (C) | 15. (B) |
| 16. (C) | 17. (D) | 18. (C) | 19. (A) | 20. (B) |

### SCIENCE

- |  |          |           |          |          |
|--|----------|-----------|----------|----------|
| 21. (D)  | 22. (D)  | 23. (B)   | 24. (B)  | 25. (C)  |
| 26. (D)  | 27. (B)  | 28. (C)   | 29. (D)  | 30. (A)  |
| 31. (ABC)  | 32. (BC) | 33. (ABD) | 34. (AC) | 35. (BD) |
| 36. (A) $\rightarrow$ (s), (B) $\rightarrow$ (p), (C) $\rightarrow$ (r), (D) $\rightarrow$ (q) |          |           | 37. (7)  | 38. (1)  |
| 39. (4)  | 40. (2)  |           |          |          |

### MATHEMATICS

- |  |           |          |          |           |
|--|-----------|----------|----------|-----------|
| 41. (C)  | 42. (C)   | 43. (A)  | 44. (B)  | 45. (B)   |
| 46. (C)  | 47. (D)   | 48. (C)  | 49. (A)  | 50. (C)   |
| 51. (AC)   | 52. (ABC) | 53. (AB) | 54. (AB) | 55. (A,B) |
| 56. ( $A \rightarrow r, B \rightarrow s, C \rightarrow p, D \rightarrow q$ ) | 57. (8)   | 58. (1)  | 59. (3)  |           |
| 60. (7)  |           |          |          |           |