MILLAT TALENT SEARCH EXAMINATION (MTSE)
2023-24

Exam Instructions

1. *Time Allotted : 3:00 hrs.*
2. *Make sure the hall ticket number entered is same as given during the registration.*
3. *The Question Papers consists of 6 sections. Attempt all the sections.*

   Section A : Mathematics   *Section E : English*
   Section B : Physics   *Section F : Logical Reasoning*
   Section C: Chemistry   *Section G: Social Science*
   Section D: Biology   *Section H: Deeniyat*
4. *Marking scheme:*

   Correct attempt   : +4 marks
   Wrong Attempt   : -1 mark
5. *We suggest students to avoid any guess work as every wrong attempt reduces 1 mark.*

SECTION – A (MATHEMATICS)

(20 × 4 = 80M)

1. The probability of guessing the correct answer to a certain test questions is $\frac{x}{12}$. If the probability of not guessing the correct answer of this question is $\frac{2}{3}$, then x =
   (1) 2   (2) 3   (3) 4   (4) 6

2. The following question contains (**STATEMENT-I Assertion and STATEMENT-II Reason)** and has following four choices (1), (2), (3) and (4), only one of which is the correct answer. Mark the correct choice.

   Statement- I (Assertion): If α and β are zeros of the quadratic polynomial $x^2 + 7x + 12$, then
 $\frac{12}{\alpha} + \frac{12}{\beta} - 24\alpha\beta = 395$
   Statement- II (Reason): If α and β are zeros of the quadratic polynomial $ax^2 + bx + c$, then
   $\alpha + \beta = -\frac{b}{a}$ and $\alpha\beta = \frac{c}{a}$

   (1) Statement –I is true, Statement -2 is true; Statement-2 is a correct explanation for Statement-I
   (2) Statement –I is true, Statement -2 is true; Statement-2 is not a correct explanation for Statement-I
   (3) Statement –I is true, Statement-2 is false
   (4) Statement – I is false, Statement-2 is true

3. If the distance between the point (a,2) and (3,4) be 8, then a = ?
   (1) $2 \pm 3\sqrt{15}$ (2) $2 - 3\sqrt{15}$ (3) $3 \pm 2\sqrt{15}$ (4) None of these

4. If $\sqrt{\frac{x}{1-x}} + \sqrt{\frac{1-x}{x}} = 2\frac{1}{6}$, the values of x are
   (1) $\frac{7}{13}, \frac{9}{13}$ (2) $\frac{5}{13}, \frac{7}{13}$ (3) $\frac{4}{13}, \frac{9}{13}$ (4) None of these

5. If $\sin\theta + \csc\theta = 2$, then the value of $\sin^{2016}\theta + \csc^{2016}\theta$ is:
   (1) 1   (2) 2016   (3) 2   (4) 4032

6. The discriminant of $\sqrt{x^2 + x + 1} = 2$ is
   (1) -3   (2) 13   (3) 11   (4) 12

7. Find the approximate area of the segment AYB of a circle (shaded region in the following figure) if the angle of the sector is 120^0, and the radius of the circle is 21 cm.
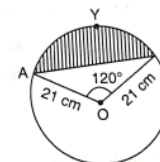

   (1) 270 cm^2 (2) 400 cm^2 (3) 570 cm^2 (4) 300 cm^2

8. In the given figure, DE // BC. Find the values of x:
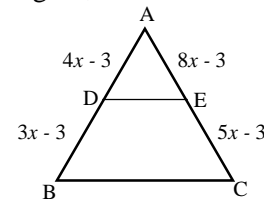
   (1) $0, \frac{3}{2}$ (2) $-1, \frac{1}{2}$ (3) $\frac{1}{2}, -3$ (4) $1, \frac{1}{2}$

9. Students of a class are made to stand in rows. If one student is extra in a row, there would be 2 rows less. If one student is less in a row there would be 3 rows more. Then the number of students in the class is
(1) 96   (2) 60   (3) 64   (4) None of these

10. The first and last terms of an A.P are 1 and 11. If the sum of its terms is 36, then the number of terms will be
(1) 5   (2) 6   (3) 7   (4) 8

11. If $3 \cos \theta = 5 \sin \theta$, then the value of $\frac{5 \sin \theta - 2 \sec^3 \theta + 2 \cos \theta}{5 \sin \theta + 2 \sec^3 \theta - 2 \cos \theta}$ is
(1) $\frac{271}{979}$ (2) $\frac{316}{2937}$ (3) $\frac{542}{2937}$ (4) None of these

12. The points A (0, -2), B (3, 1), C (0, 4) and D (-3, 1) taken in order are the vertices of a
(1) Rectangle   (2) Square   (3) Rhombus   (4) None of these

13. If the angles of elevation of a tower from two points distant a and b (a>b) from its foot and in the same straight line from it are 30^0 and 60^0, then the height of the tower is:
(1) $\sqrt{a + b}$ (2) $\sqrt{ab}$ (3) $\sqrt{a - b}$ (4) $\sqrt{\frac{a}{b}}$

14. The algebraic sum of the deviations of a frequency distribution from its mean is
(1) Always positive   (2) Always negative
(3) 0   (4) A non- zero number

15. ABCD is a trapezium in which AB ll CD, AB = 5 cm , AD = 7.5 cm , CD = 9 cm. What is the length of BC?
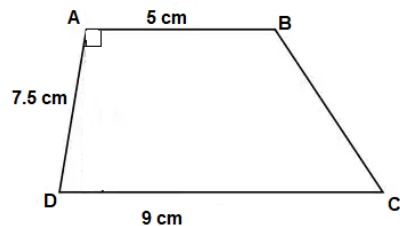
(1) 8 cm   (2) 8.5 cm   (3) 9cm   (4) 9.3 cm

16. If a wire is bent into the shape of a square, then the area of the square is 81 cm². When the same wire is bent into a semi-circular shape, then find the area of the semi-circle:
(1) 22 cm²   (2) 44 cm²   (3) 77 cm²   (4) 154 cm²

Directions for Q17 and Q18.
To enhance the reading skills of grade X students, the school nominates you and two of your friends to set up a class library. There are two sections – section A and section B of grade X. There are 32 students in section A and 36 students in section B.

17. What is the minimum number of books you will acquire for the class library, so that they can be distributed equally among students of Section A or Section B?
(1) 144   (2) 2   (3) 288   (4) 4

18. If p and q are positive integers such that $p = ab^2$ and $q = a^2 b$, where a,b are prime numbers, then the LCM (p,q) is
(1) ab   (2) $a^2 b^2$ (3) $a^3 b^2$ (4) $a^3 b^3$

19. PA and PB are the two tangents drawn to the circle. O is the centre of the circle. A and B are the points of contact of the tangents PA and PB with the circle of $\angle OPA = 35°$. Then $\angle POB =$
(1) 55º   (2) 65º   (3) 75º   (4) 85º

20. A sphere is inscribed in a cube, then the ratio of the volume of the sphere to the volume of the cube is
(1) $\pi : 2$ (2) $\pi : 3$ (3) $\pi : 4$ (4) $\pi : 6$

SECTION - B (PHYSICS)

$(15 \times 4 = 60M)$

21. If the distance between the earth and the sun increases by 125 % of its present value, then the duration of one year will be:
(1) 365 days   (2) $\frac{25}{16} \times 365$ days
(3) $\frac{27}{8} \times 365$ days   (4) $\frac{9}{4} \times 365$ days

22. A gun of mass 1 kg fires 4 bullets per second each of mass 20 g with a velocity 300 m s^{-1}. The force required to hold the gun is:
(1) 24 N   (2) 28 N   (3) 32 N   (4) 10 N

23. A car and a motorcycle are moving with the same momentum. When equal retarding forces are applied, the car comes to halt in t_1 seconds and the motorcycle in t_2 seconds. If the mass of the car is five times more than the mass of the motorcycle, then
(1) $t_1 = t_2$ (2) $t_1 = 5t_2$ (3) $t_1 = \frac{1}{5} t_2$ (4) $t_1 = 25t_2$

24. An object is placed at a distance of 40cm in front of a concave mirror of a focal length of 20 cm. The image produced is:
(1) virtual and inverted
(2) real and erect
(3) real, inverted and of the opposite size as that of the object
(4) real, inverted and of the same size as that of the object

25. A far sighted person has a near point of 60 cm. What power lens should be used for eye glasses such that the person can read a book at a distance of 25 cm.
(1) −2.33 D   (2) + 2.33 D   (3) −1.33 D   (4) −3.50 D

26. A 10 mm long awl pin is placed vertically in front of a concave mirror. A 5mm long image of the awl pin is formed at 30cm in front of the mirror. The focal length of this mirror is:
(1) -30 cm   (2) -20 cm   (3) -40 cm   (4) -60 cm

27. A car weighing 500 kg working against a resistance of 500 N, accelerate from rest to $20 m s^{-1}$ in 100 m. What is the work done by the engine?
(1) $1.0 \times 10^5 J$ (2) $1.5 \times 10^5 J$ (3) $1.05 \times 10^5 J$ (4) Data is insufficient

28. The figure shows a circuit diagram. What is being measured using the voltmeter?
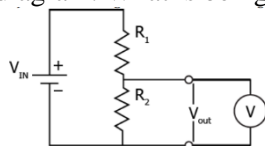
(1) Current in the circuit   (2) Voltage in the circuit
(3) The voltage across the resistor   (4) The resistance offered by the resistor

29. The least resistance obtained by using 2 Ω, 4 Ω, 1 Ω and 100 Ω is
(1) < 100 Ω   (2) < 4 Ω   (3) < 1 Ω   (4) > 2 Ω

30. Unit of electric power may also be expressed as
(1) Volt-ampere   (2) Kilowatt-hour   (3) Watt second   (4) Joule second

31. Two stretched membranes of area $2cm^2$ and $3cm^2$ are placed in a liquid at the same depth. The ratio of the pressure on them, is:
(1) 1 : 1   (2) 2 : 3   (3) 3 : 2   (4) 22 : 33

32. Two magnetic field lines:
(1) Intersect at the neutral point
(2) Never intersect each other
(3) Intersect near north-pole or south pole
(4) Intersect at the midpoint of the magnet

33. The front face of a circular loop of a wire carrying current behaves like north-pole, the direction of current in this face of the loop will be:
(1) Clockwise   (2) Anticlockwise   (3) Towards North   (4) Towards South

34. An echo is returned in 3 s. If the speed of sound is 342 ms^{-1}, then the distance between the source of sound and the reflecting body is:
(1) 351 m   (2) 513 m   (3) 153 m   (4) None of these

35. A boat at anchor is rocked by waves, such that the distance between two consecutive crests is 100 m. If the wave velocity is $20 ms^{-1}$ the frequency of rocking boat is
(1) 2 Hz   (2) 1 Hz   (3) 0.5 Hz   (4) 0.2 Hz

SECTION - C (CHEMISTRY)

(15 × 4 = 60M)

36. NH_4OH is an example of a base which turns Phenolphthalein colour to
(1) Orange   (2) Blue   3) Pink   (4) Colourless

37. Coal; Coke; Charcoal; Lamp black; graphite, methane, ethyne, Acetic acid, C_{60} and Diamond. Out of all, how many are the amorphous form of carbon?
(1) 3   (2) 4   (3) 5   (4) 7

38. The products of combustion are
(1) CO and H_2 (2) CO_2 and H_2 (3) CO and H_2O (4) CO_2 and H_2O

39. An element becomes after losing one electron. The element is

(1) Aluminium   (2) Sodium   (3) Lithium   (4) Potassium

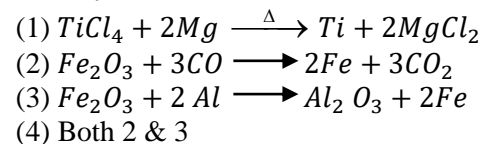40. Rashid under the guidance of his science teacher had set up an apparatus as shown below.

This arrangement is the simulation of
(1) Thomson model   (2) Bohr's model
(3) Rutherford's model   (4) Planck's model

41. II A group is called as _____ family and they have _____ number of electrons in the outermost shell and have _____ valency.
(1) Alkali metals, 2 and 2 respectively
(2) Alkaline earth metals, 1 and 1 respectively
(3) Alkaline earth metals, 2 and 2 respectively
(4) none of these

42. The method of enrichment of ore used for sulphide ores is
(1) Washing   (2) Froth flotation
(3) Magnetic separation   (4) Hand picking

43. If a metal (M) forms MSO_4, then its nitrate formula would be
(1) MNO_2 (2) MNO_3 (3) M_2NO_3 (4) $M(NO_3)_2$

44. How many no. of moles are present in 64 g of O_2 gas?
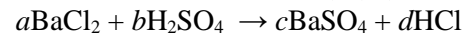(1) 2   (2) 3   (3) 4   (4) 5

45. The IUPAC name of
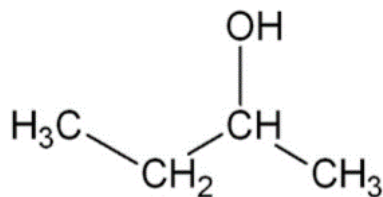
(1) Butan-1-ol   (2) Butanol   (3) Butan-3-ol   (4) Butan-2-ol

46. Identify the Thermite reaction from the following
(1) $TiCl_4 + 2Mg \xrightarrow{\Delta} Ti + 2MgCl_2$
(2) $Fe_2O_3 + 3CO \longrightarrow 2Fe + 3CO_2$
(3) $Fe_2O_3 + 2\,Al \longrightarrow Al_2O_3 + 2Fe$
(4) Both 2 & 3

47. What are the coefficients a, b, c, and d respectively for the following equation?
$a\mathrm{BaCl_2} + b\mathrm{H_2SO_4} \rightarrow c\mathrm{BaSO_4} + d\mathrm{HCl}$
(1) 1, 1, 1, 2   (2) 1, 1, 2, 2   (3) 1, 2, 2, 1   (4) 2, 2, 1, 2

48. Zainab is diluting acid by adding acid to water. Why can't she add water to acid?
(1) Because adding of water to acid releases heat which causes burn to skin
(2) Adding water to acid or acid to water are acceptable ways of dilution
(3) Diluting by adding water to acid requires heat
(4) None of the reasons are right

49. Among metallic nature (X), non-metallic nature (Y), Atomic size (A) and Electronegativity (B), the properties which decreases down the group are/is:
(1) Only Y   (2) Both X and Y   (3) Both A and Y   (4) Both B and Y

50. Which one of the element never exists in free-state?
(1) Al   (2) Au   (3) Zn   (4) Cu

SECTION - D (BIOLOGY)

(10 × 4 = 40M)

51. Chemotropism means response towards
(1) Water   (2) Chemicals   (3) Gravity   (4) Light

52. Gums are used as -
(1) Adhesives   (2) Binding agents
(3) Medicines   (4) All of the above

53. Study of fossils is called --------
(1) Ornithology   (2) Archaeology   (3) Histology   (4) Paleontology

54. Gaseous exchange takes place within the lungs from the alveoli to blood capillaries and vice versa due to the process of _____
(1) Osmosis   (2) Peristalsis   (3) Diffusion   (4) Transportation

55. Arteries are _____ when compared to veins
    (1) Strong and elastic　　　　　(2) Weak and non-elastic
    (3) Weak and elastic　　　　　　(4) Short and narrow

56. Which plant hormone helps in cell elongation & differentiation?
    (1) Cytokinins　(2) Gibberellins　(3) Ethylene　(4) Auxins

57. In the process of inspiration _____ mechanism/s takes place.
    (1) Diaphragm flattens
    (2) volume of chest cavity increased
    (3) Air from outside rushes into lungs
    (4) All of the above

58. The alleles of two or more different genes get sorted into gametes independently of one another. This is known as _____
    (1) Law of Independent Assortment
    (2) Law of Dominance
    (3) Law of Segregation
    (4) None of the above

59. Haemophilia is _____ chromosome linked disorder.
    (1) X　　　　　(2) Y　　　　　(3) Z　　　　　(4) Autosomal

60. Function of the cerebro-spinal fluid is _____
    (1) To protect brain　　　　　(2) Serves as shock absorbing medium
    (3) Both 1 and 2　　　　　　　(4) To maintain shape of spinal cord

SECTION - E (ENGLISH)

(5 × 4 = 20M)

Saina Nehwal is already a big star at such a young age. It will bring a lot of media attention. What is important is not to get carried away. It is equally important to realize that she has a long career ahead of her and a lot more tournaments to win. From whatever little I know of Saina, I am sure, she will stay focused and it is only a matter of time before she becomes World No.1. Full credit goes to her coach Pullela Gopichand for the way he has planned and executed her progress as well as the support team of the physiotherapist and physical trainer who, as always work quietly behind the scenes.

Saina, you have made all of us proud, you have the ability to go all the way. In this format it will not be possible to win every tournament you enter. What is critical is choosing your tournaments carefully and resting enough between them to make sure that you remain in peak condition all the time and injury-free. This is just the beginning. Do not worry about the odd loss here and there. Keep it up. The entire country is with you.

61. What is the main advice given to Saina in the passage?
    (1) Focus on winning every tournament
    (2) Avoid media attention
    (3) Stay grounded and focused on a long career
    (4) Stop playing in tournaments

62. Who is credited in the passage for Saina's progress and success?
    (1) Saina's family
    (2) The media
    (3) Saina herself
    (4) Coach Pullela Gopichand and the support team

63. What message does the author convey about Saina's future in the passage?
    (1) She should retire after her current achievements
    (2) Her success is a fluke
    (3) This is just the beginning of her career
    (4) She will never achieve anything significant

64. Which sentence in the passage contains a direct address to the person being spoken to?
    (1) "Saina Nehwal is already a big star at such a young age."
    (2) "You have made all of us proud."
    (3) "It is equally important to realize that she has a long career ahead of her."
    (4) "From whatever little I know of Saina, I am sure she will stay focused."

65. Select the term which is not the synonym of the word 'critical' according to the context.
    (1) Analytical　(2) Evaluative　(3) Interpretive　(4) Serious

SECTION - F (LOGICAL REASONING)

(15 × 4 = 60M)

66. If P is a brother of Q, M is a sister of Q and T is a brother of P, then how Q is related to T?
    (1) Sister　　　　(2) Brother　　　　(3) Brother or Sister　　　　(4) None of these

67. Q is the brother of R;
P is the sister of Q;
T is the brother of S;
S if the daughter of R. Who are the cousins of Q?
(1) R and P (2) P and T (3) Q and T (4) S and T

68. If A means (+), and B means (−), C means (÷) and D means '×', find the value of the following expression: 4A9D5C15
(1) 10 (2) 8 (3) 4 (4) 7

69. In a group of buffaloes and ducks the number of legs are 24 more than twice the number of heads. What is the number of buffaloes in the group?
(1) 6 (2) 18 (3) 12 (4) 24

70. 100, 50, 52, 26, 28, ?, 16, 8
(1) 30 (2) 36 (3) 14 (4) 12

71. 1, 2, 3, 5, 8, 13, 21, 34, ?
(1) 31 (2) 44 (3) 55 (4) 54

72. Anuja goes 5Km towards east from a fixed point N, and then 35 Km after turning to her left. Again she goes 10Km after turning to her right. After this she goes 35Km after turning to her right. How far is she from N?
(1) 10 km (2) 20 km (3) 15 km (4) 5 km

73. Ranjith walked 40m facing towards north. From there he walked 50m after turning to his left. After this he walked 40m after turning to his left. How far and in what direction is he now from his starting point?
(1) 40m East (2) 35m West (3) 50m West (4) 50m East

74. Six people – P, Q, R, S, T and U are sitting in a same row at equal distance. All are facing north. Only one person is sitting between Q and R. S is sitting third to the left of R. Two persons are sitting between T and U. T is sitting 2nd to the right of R. How many people are sitting between P and S?
(1) Two (2) Four (3) Three (4) Five

75. Seven students who got university positions are sitting in a straight line facing north. Mahi is sitting second to the right of Mukesh who is sitting at extreme left end. Maahir is sitting to the immediate left of Ramesh. Ramesh is also sitting at one of the extreme end. Vansh is sitting exactly in the middle of the row. Vanshika is sitting to the immediate right of Vansh. The one who is second to the left of Vansh is Varinda.
Who is sitting fifth to the left of Maahir?
(1) Mukesh (2) Vansh (3) Varinda (4) Mahi

76. Some students are standing in a straight line. Nidhi is 19th from the right end of the line and Palak is at 15th position from the left end of the line. Both Nidhi and Palak exchange their positions after which Kanika who was 24th from the left end is now at the 5th position. How many people are standing in total?
(1) 47 (2) 48 (3) 49 (4) 50

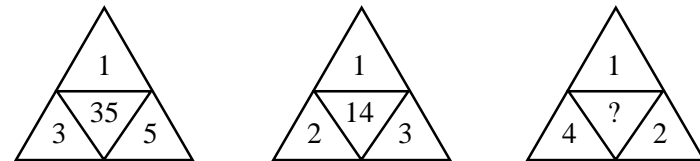77. Choose the correct mirror image of the question figure, from the given answer figures.

(1) (2) (3) (4)
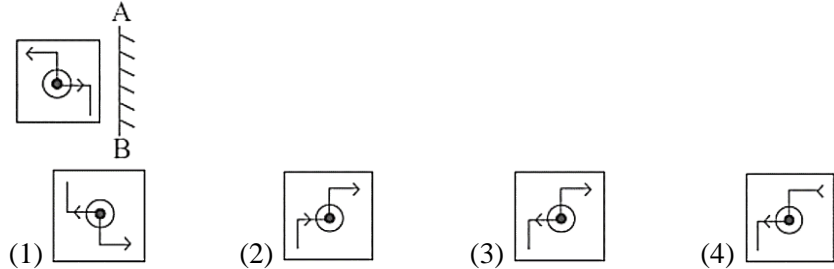
78. What will be the digit on the opposite face of the particular face having digit 4 in the dice given below?
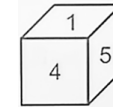
(1) 3 (2) 1 (3) 2 (4) 6

79. Find the missing number?

4	3	8
9	7	2
8	6	4
44	27	?

(1) 84 (2) 14 (3) 20 (4) 64

80. Find the number in the place of (?)

(1) 21 (2) 22 (3) 29 (4) 20

SECTION - G (SOCIAL SCIENCE)

(10 × 4 = 40M)

81. In the context of the Indian economy, which sector is primarily engaged in agriculture, forestry, and fishing?
    (1) Primary sector
    (2) Secondary sector
    (3) Tertiary sector
    (4) Quaternary sector

82. Who was the chairman of the drafting committee of the Indian Constitution?
    (1) Jawaharlal Nehru
    (2) Sardar Patel
    (3) B.R. Ambedkar
    (4) Mahatma Gandhi

83. How do Multinational Corporations (MNCs) contribute to globalization?
    (1) By promoting economic isolation
    (2) By restricting international trade
    (3) By investing and operating in multiple countries
    (4) By advocating for protectionist policies

84. What is the main responsibility of the Chief Election Commissioner?
    (1) Formulating economic policies
    (2) Conducting elections in a free and fair manner
    (3) Enforcing law and order
    (4) Appointing judges to the Supreme Court

85. What is the primary function of Self Help Groups (SHGs) in India?
    (1) Providing higher education
    (2) Promoting large-scale industries
    (3) Poverty alleviation and empowerment
    (4) Agricultural research

86. What is the fundamental principle of a democratic government?
    (1) Rule by the military
    (2) Rule by the people
    (3) Rule by a single leader
    (4) Rule by the aristocracy

87. What is the primary drawback of the barter system?
    (1) Lack of double coincidence of wants
    (2) Simplicity and efficiency
    (3) Stable value of goods
    (4) Government regulation

88. Which sector contributes the most to the Gross Domestic Product (GDP) of India?
    (1) Primary sector
    (2) Secondary sector
    (3) Tertiary sector
    (4) Quaternary sector

89. What is the role of Self Help Groups (SHGs) in the context of financial inclusion?
    (1) Promoting tax evasion
    (2) Encouraging consumerism
    (3) Providing banking services to marginalized communities
    (4) Regulating stock markets

90. What is the primary role of the International Monetary Fund (IMF)?
    (1) Promoting international trade agreements
    (2) Stabilizing exchange rates and providing financial assistance
    (3) Regulating multinational corporations
    (4) Facilitating cultural exchanges

SECTION - H (DEENIYAT)

(10 × 4 = 40M)

91. The age of Prophet (PBUH) when his mother Hazrat Aamina (R.A) died was __.
    (1) 4 years   (2) 6 years   (3) 9 years   (4) 12 years

92. Mandatory act before performing Salah is _____.
    (1) Ablution   (2) Forgiveness   (3) Charity   (4) All of these

93. Which book belongs to Hazrat Moosa (A.S)?
    (1) Quran   (2) Injeel   (3) Torah   (4) Zaboor

94. What is the duty of Hazrat Jibraeil (A.S)?
    (1) To convey Allah's message to prophets
    (2) To capture soul
    (3) To manage rains and food for creature
    (4) All of the above

95. Which is the most important worship in Islam?
    (1) Hajj   (2) Fasting   (3) Salah   (4) Charity

96. Which act is not the sunnah of drinking water?
    (1) To say Bismillah before drinking   (2) To do ablution before drinking
    (3) To sit and drink   (4) To drink with right hand

97. The questions asked in the grave will be related to _____.
    (1) God, Religion and Prophet   (2) Religion, Prayers and Charity
    (3) Salah, Fasting and Hajj   (4) All of these

98. Who was the first Muazzin in Islam?
    (1) Ammar Ibn Yasser   (2) Abdullah Ibn Masood
    (3) Bilal Ibn Rabah   (4) None of these

99. What do Muslims recite throughout the Hajj?
    (1) Al-Fatiha   (2) Talbiya
    (3) Declaration of Hajj   (4) There is no specific recitation

100. During which month is the Hajj performed?
    (1) Dhul-Hijjah   (2) Ramadhan
    (3) Muharram   (4) Rajjab