VISTO - 2016 - 17

(VELAMMAL INTER SCHOOL SCIENCE TALENT OLYMPIAD)

SEASON - I (MOCK TEST 1)

CLASS - IX

Duration : 2hrs   **Max.Marks : 100**

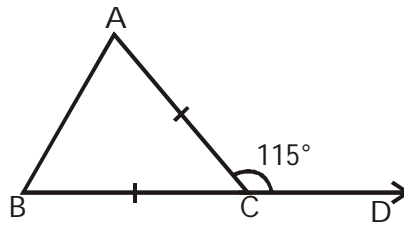**Instructions To the Candidate**

1. a) Write your **NAME** and **CLASS** in the space provided on **OMR** Response sheet.

    b) You have to mark the answers on the **OMR** Response sheet only.

    c) You have to handle the **OMR** Response sheet with utmost care.

    d) Do not fold/mutilate or make any unnecessary markings on the **OMR** Response sheet.

    e) Use **BLUE** or **BLACK BALL POINT PEN** only to darken the appropriate circles in **OMR** Response sheet.

2. Answers marked with **PENCIL** will not be considered for evaluation.

3. This Question Paper consists of **100 QUESTIONS**, under four subjects heads, **MATHEMATICS (40 Questions), PHYSICS (20 Questions), CHEMISTRY (20 Questions) and BIOLOGY (20 Questions).**

4. Each question has four alternative responses marked a, b, c, d. You have to darken the appropriate circle provided in the OMR Response sheet against each question.

5. **1 MARK** will be awarded for every correct response for all the questions in **ALL THE FOUR SUBJECTS.**

6. **NO** mark will be deducted for incorrect response.

7. Usage of Calculators, Log tables and Electronic gadgets is strictly prohibited in the examination hall.

8. Return the OMR Response sheet to the Invigilator at the end of Examination, before leaving the examination hall.
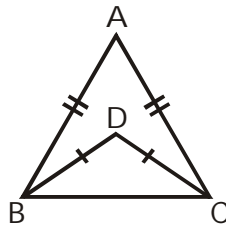
MATHEMATICS

Single Response Type :

1. The value of $\dfrac{3\sqrt{12}}{6\sqrt{27}}$ is

    A) $\sqrt{2}$ B) $\dfrac{1}{2}$ C) $\sqrt{3}$ D) $\dfrac{1}{3}$

2. $\left(5+\sqrt{8}\right)+\left(3-\sqrt{2}\right)\left(\sqrt{2}-6\right)$ is

    A) positive and irrational   B) positive and rational

    C) negative and irrational   D) negative and rational

3. The simplest form of $25^{\frac{1}{3}} \times 5^{\frac{1}{3}}$ is

    A) 625   B) 125   C) 25   D) 5

4. If $\sqrt{3} = 1.732$ and $\sqrt{2} = 1.414$ then the value of $\dfrac{1}{\sqrt{3} - \sqrt{2}}$ is

    A) 0.318   B) 31.8   C) 3.146   D) 31.46

5. If a = -2 and b = -1 then $a^b - b^a$ is equal to

    A) - 3   B) - 1   C) 0   D) -2

6. " Lines are parallel if they do not intersect" is stated in the form of

    A) a proof   B) a postulate   C) a definition   D) an axiom

7. The edge of a surface are

    A) points   B) lines   C) curve   D) None

8. The number line segments determined by three non-collinear points is

    A) 0   B) 1   C) 2   D) 3

9. If 'C' lies between A and B and AB = 10 cm , AC = 3 cm then BC² = _____

    A) 49 cm^2 B) 13 cm^2 C) 9 cm^2 D) 7 cm^2

10. The "sriyantra" consists of _____ inter woven isosceles triangles

    A) 1   B) 9   C) 3   D) 6

11. In the adjoining figure BC = AC. If $\angle ACD = 115°$, then $\angle A$ is

    A) 65°   B) 50°   C) 70°   D) 57.5
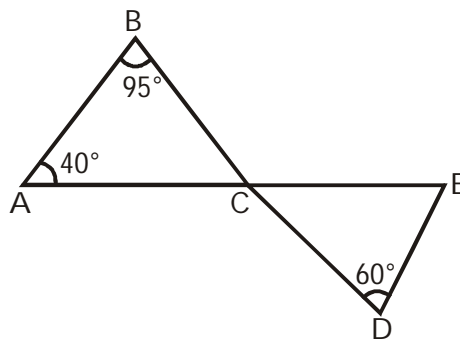
12. In the adjoining figure AB = AC and BD = CD then the ratio $\angle ABD : \angle ACD$ is
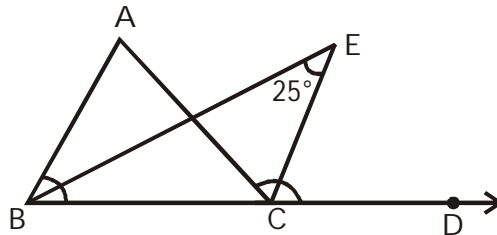

    A) 1 : 1   B) 1 : 2   C) 2 : 3   D) 2 : 1

13. If is not possible to construct a triangle when the length of its sides are

A) 6, 7, 8   B) 5.3, 2.2, 3.1   C) 9.3, 5.2, 7.4   D) 4, 6, 6

14. If triangle ABC is obtuse angle and $\angle C$ is obtuse then

A) AB = BC   B) AC > AB   C) AB < BC   D) AB > BC

15. $\angle x$ and $\angle y$ are exterior angles of a triangle of a triangle ABC at the points B and C respectively also $\angle B > \angle C$ then relation between $\angle x$ and $\angle y$ is

A) $\angle x < \angle y$ B) $\angle x > \angle y$ C) $\angle x = \angle y$ D) None

16. The cost of turfing a triangular field at the rate of Rs 45 per $100 \ m^2$ is Rs 900. If the double the base of the triangle is 5 times its height then its height is

A) 40   B) 42   C) 44   D) 46

17. The area of an isosceles triangle having base 2 cm and the length of one of the equal sides 4 cm is

A) $4\sqrt{15}$ B) $\dfrac{\sqrt{15}}{2}$ C) $2\sqrt{15}$ D) $\sqrt{15}$

18. If side of a scalene triangle is doubled then area would be increased by

A) 50%   B) 75%   C) 100%   D) none

19. Semiperimeter of scalene triangle of side x, 2x and 3x is

A) 3x   B) 2x   C) 4x   D) x

20. If $x+\dfrac{1}{x}=7$ then the value of $x^3 +\dfrac{1}{x^3}$ is

A) 320   B) 322   C) 321   D) 323

21. The value of $x^3 + y^3 + 15xy - 125$ when x + y = 5 is

A) 3   B) 2   C) 1   D) 0

22. If $a^2 + b^2 + c^2 = 30$ and a + b + c = 0 then the value of ab + bc + ca is

A) 35   B) 30   C) 40   D) 45

23. If f(x) = $x^2 - 5x + 1$ then the value of f(2) + f(-1) is

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

24. The point (7, 0) lies

A) in quadrant II   B) on the positive direction of x-axis

C) in quadrant III   D) on the positive direction of y-axis

25. Abscissa of all points on the y-axis is

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

26. If O(0, 0) A(3, 0), B(3, 4), C(0, 4) are the vertices of a quadrilateral OABC then OABC is

    A) trapezium   B) Rectangle   C) Square   D) Rhombus

27. The point which lies on Y-axis at a distance of 3 units in the negative direction of y-axis is

    A) (3, 0)   B) (0, 3)   C) (0, -3)   D) (-3, 0)

28. If two angles are supplementary and the larger is 20° less than three times the smaller than the angles are

    A) $62\dfrac{1°}{2}$, $27\dfrac{1°}{2}$ B) 140°, 40°   C) 130°, 50°   D) $72\dfrac{1°}{2}$, $17\dfrac{1°}{2}$

29. In the adjoining figure if A = 40°, B = 95° and D = 60° then E is equal to

    A) 55°   B) 85°   C) 75°   D) 65°

30. In the adjoining figure BE and CE are bisectors of $\angle ABC$ and $\angle ACD$ respectively. If $\angle BEC$ = 25° then $\angle BAC$ is equal to

    A) 50°   B) 65°   C) $12\dfrac{1°}{2}$ D) $25\dfrac{1°}{2}$

Assertion and Reasoning Type :

31. **Statement 1 :** Let P(x) be any polynomial of degree greater then or equal to one and 'a' be any real number. If P(x) is divided by (x - a) then the remainder is equal to P(a)

     Statement 2 : The remainder of $x^4 - 3x^2 + 2x + 1$ when divided by x - 1 is 1.

     A) Statement 1 is true, Statement - 2 is false

     B) Statement 1 is true, Statement - 2 is true

     C) Statement 1 is false, Statement - 2 is false

     D) Statement 1 is false, Statement - 2 is true

32. Statement 1 : The sum of whose measures is 180° are called the supplementary angles

     Statement 2 : Two supplementary angles differ by 34° the angles are 74°, 106°

     A) Statement 1 is true, Statement - 2 is false

     B) Statement 1 is true, Statement - 2 is true

     C) Statement 1 is false, Statement - 2 is false

     D) Statement 1 is false, Statement - 2 is true

     Linked Comprehensive Type :

I.   It is given that $\sqrt{2} = 1.414$, $\sqrt{3} = 1.732$, $\sqrt{5} = 2.236$, $\sqrt{10} = 3.162$

33. The value of $\dfrac{\sqrt{2} + 1}{\sqrt{5}}$ is

     A) 1.082   B) 1.179   C) 1.07   D) 1.079

34. The value of $\dfrac{2 - \sqrt{3}}{\sqrt{3}}$ is

     A) 0.15   B) 0.154   C) 0.145   D) 0.45

35. The value of $\dfrac{\sqrt{10} - \sqrt{5}}{2}$ is

     A) 0.655   B) 0.6   C) 0.56   D) 0.76

     Linked Comprehensive Type :

II. If a, b, c denote the lengths of the sides of a triangle ABC, then Area of

     $\triangle ABC = \sqrt{s(s-a)(s-b)(s-c)}$ where $S = \dfrac{a+b+c}{2}$

36. An isosceles triangle has perimeter 30 cm and each of the equal sides is 12 cm. Find the area of the triangle

     A) $7\sqrt{15}$ cm^2 B) $9\sqrt{15}$ cm^2 C) $3\sqrt{15}$ cm^2 D) $2\sqrt{15}$ cm^2

37. The perimeter of a triangle field is 450 m and its sides are in the ratio 13 : 12 : 5. Find the area of the triangle

    A) 6025 m^2 B) 6075 m^2 C) 6750 m^2 D) 6057 m^2

38. Find the percentage increase in the area of a triangle if its each side is doubled
    A) 300%   B) 200%   C) 100%   D) 50%

    Matrix Matching Type :

39. **Column - I**   **Column - II**

    1) $\left(5\sqrt{3} - 3\sqrt{5}\right) + \left(6\sqrt{3} - 2\sqrt{5}\right) =$ p) 216

    2) $2\sqrt{72} \times 3\sqrt{18} =$ q) 3

    3) $\left(2° + 3° + 5°\right) =$ r) $11\sqrt{3} - 5\sqrt{5}$

    4) $\left(125\right)^{\frac{2}{3}} \times \left(125\right)^{\frac{4}{3}} =$ s) 15625

    A) 1 - p, 2 - s, 3 - r, 4 - p   B) 1 - r, 2 - p, 3 - s, 4 - q
    C) 1 - r, 2 - p, 3 - q, 4 - s   D) 1 - p, 2 - r, 3 - q, 4 - s

40. **Column - I**   **Column - II**

    1) The angles whose measure is less   p) opposite angles
    than 90° are called

    2) Two adjacent angles are said to   q) acute angles
    form linear pair if their arms form
    two pair of

    3) If no sides of triangle are equal, triangle   r) 7°
    is called

    4) Complement of 83° is   s) scalene triangle
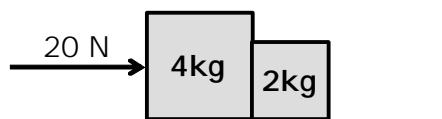   A) 1 - q, 2 - s, 3 - p, 4 - r   B) 1 - q, 2 - p, 3 - s, 4 - r
    B) 1 - s, 2 - p, 3 - q, 4 - r   D) 1 - p, 2 - q, 3 - s, 4 - r

PHYSICS

Single Response Type :

41. A man is at rest in the middle of a pond on perfectly smooth ice. He can get himself to the shore by making use of Newton's :
    A) First law   B) Second law   C) Third law   D) All the laws

42. A jet plane flies in the air because :

   A) The gravity does not act on bodies moving with high speeds

   B) The thrust of the jet compensates for the force of gravity

   C) The flow of air around the wings causes an upward force, which compensates for the force of gravity

   D) The weight of air whose volume is equal to the volume of the plane is more than the weight of the plane

43. The acceleration of a body is to be doubled from its initial value. By what factor is the acting force to be increased ?

   A) half   B) two   C) four   D) one of these

44. A gun recoils when it is fired. The recoil is the result of action-reaction force pairs. As the gases from the gunpowder explosion expand, the gun pushes the bullet forwards and the bullet pushes the gun backwards. The acceleration of the recoiling gun is ...

   A) greater than the acceleration of the bullet.

   B) smaller than the acceleration of the bullet.

   C) the same size as the acceleration of the bullet

   D) none of these

45. A car moving at 72 kmph is to be stopped by applying brakes in the next 10m. If the car weights 1000 kg. The average force applied on the car is

   A) 2×10^4 N   B) 3×10^4 N   C) 7200 N   D) 3×10^6 N

46. A block of mass 2 kg placed on a long frictionless horizontal table is pulled horizontally by a constant force F. It is found to move 10m in the first two seconds.The magnitude of F *is* ___.

   A) 10N   B) 20 N   C) 30 N   D) 40 N

47. Raindrops of radius 1 mm and mass 4 mg are falling with a speed of 30 m/s on the head of a bald person. The drops splash on the head and come to rest. Assuming equivalently that the drops cover a distance equal to their radii on the head, estimate the force exerted by each drop on the head.

   A) 1.0N   B) 1.8 N   C) 3.0 N   D) 4.0 N

48. A hammer with a 500 gm head is used to be drive nails horizontally into a wall. A force of 450 N is required to penetrate the wall. Each blow should force the nail 5 mm into the wall. What should be the velocity of the hammer head to strike the nail

   A) 9m/s   B) 1.5 m/s   C) 3 m/s   D) 6m/s

49. Two blocks of mass 4 kg and 2 kg are placed side by side on a smooth horizontal surface as shown in the figure.
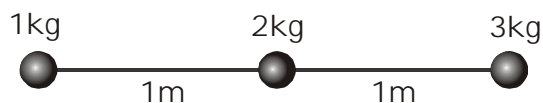

   A horizontal force of 20 N is applied on 4 kg block. Find the acceleration of each block

   A) $\frac{10}{3}$ m/s^2 B) $\frac{20}{3}$ m/s^2 C) $\frac{5}{3}$ m/s^2 D) $\frac{16}{3}$ m/s^2

50. In the above problem, the normal reaction between two blocks.

   A) $\dfrac{10}{3}$ N   B) $\dfrac{16}{3}$ N   C) $\dfrac{20}{3}$ N   D) $\dfrac{25}{3}$ N

51. When the medium between two bodies changes, force of gravitation between them

   A) Will increase

   B) Will decrease

   C) Will change according to the environment

   D) Will not change under any condition

52. In universal law of gravitation the constant G is

   A) Independent of the nature of the particles

   B) Independent of space where they are kept

   C) Independent of time at which the force is considered

   D) All of these

53. The gravitational force of attraction between two spherical bodies, each of mass 100kg, if the distance between their centres is 100m, is

   A) 6.67×10^{-11} N   B) 6.67×10^{-9} N   C) 6.67N   D) 6.67×10^{-4} N

54. Find the distance of a point from the earth's centre where the resultant gravitational force on a 1 kg body due to the earth and moon is zero. (The mass of the earth is 6×10^{24}kg and that of the moon is 7.4×10^{22} kg. The distance between the earth and the moon is 4×10^{5}km.)

   A) 3600×10^{5} m   B) 3.6×10^{5} Km   C) both A) and B)   D) 3.6×10^{5} m

55. The gravitational force between two bodies is 6.67×10^{-7}N. When the distance between their centres is 10m. If the mass of the first body 800kg, then the mass of the second body is

   A) 1000kg   B) 1250kg   C) 1500kg   D) 2000kg

Matrix Matching Type :

56. Three bodies of masses 1kg ,2kg and 3kg are separated as shown in figure.Then

     1kg   2kg   3kg

               1m   1m

Column - I	Column - II
a) the net force on 1 kg body is	p) 18.34×10^{-11} N
b) the net force on 2 kg body is	q) 53.36×10^{-11} N
c) Net force on 3kg body is	r) 45×10^{-11} N
d) the force on 1 kg body due to 2 kg body is	s) 13.34×10^{-11} N

   A) a - p, b - q, c - r, d - s   B) a - p, b - s, c - r, d - q

   C) a - p, b - q, c - s, d - r   D) a - s, b - q, c - r, d - p

Statement Type:

57. **Statement 1:** Force of attraction between two bodies does not depend upon the shape of the masses

    Statement 2: The value of universal gravitational constant changes with change of place.

    A) Both the statements are true   B) Both the statements are false

    C) Statement 1 is true but statement 2 is false

    D) Statement 1 is false but statement 2 is true

58. If the weight of an object is 60 kg on earth then, its weight on moon is

    A) 10 kg   B) 20 kg   C) 30 kg   D) 40 kg

59. If the mass of the earth is increased by 1% without change in its radius, then

    A) The value of g increases by 1%   B) The value of g decreases by 1%

    C) The value of g decreases by 2%   D) No change in value of g

60. The ratio of S.I units to C.G.S units of acceleration due to gravity (g) is

    A) 10^2 B) 10   C) 10^{-1} D) 10^{-2}

CHEMISTRY

Single Response Type :

61. A solid has _____.

    A)   maximum intermolecular space

    B) definite mass but no definite volume

    C) very high compressibility

    D) maximum intermolecular force of attraction

62. The freezing point of water is lowered by

    A) Increasing pressure   B) Presence of impurities

    C) Both A and B are correct   D) None of these

63. Dry ice is used in fire extinguishers. The dry ice is stored in the cylinder in a solid form. When sprayed on a fire it quickly changes into the gas known as carbon dioxide (CO_2). What is this change of state called?

    A) Sublimation   B) Condensation   C) Distillation   D) Evaporation

64. The process by which wet clothes dry up is called _____.

    A) evaporation   B) boiling   C) condensation   D) solidification

65. Identify the wrong statement among the following.

    A) Molecules of solids possess only vibratory motion.

    B) Solids are incompressible.

    C) Solids have only one free surface.

    D) Gases are highly diffusible.

66. State true or false.

P) All metals react with other substances to form chemical compounds.

Q) All the elements having one electron in their outermost shell are metals.

R) Metals are good reducing agents.

S) Non metals are good oxidizing agents.

	P	Q	R	S
A)	True	False	True	False
B)	False	True	False	False
C)	True	True	False	False
D)	False	False	True	True

67. Which of the following are poly atomic ions?

p) Sulphate ion   q) Hydrogen   r) Hydride ion   s) Nitrite ion

A) only P, Q   B) only Q, R   C) only P, S   D) All

68. A mixture of mercury and copper is an example of _____.

A) Solid and solid   B) Liquid and solid

C) Solid and liquid   D) Liquid and liquid

69. Which of the following is not a mixture?

A) Blood   B) Silver coins   C) Saliva   D) Plutonium

70. Chemical changes are_____.

A) Temporary, reversible and a new substance is formed

B) Always accompanied by exchange of light.

C) permanent, irreversible and a new substance is produced

D) never accompanied by exchange of light and heat energy

71. Which pair is a miscible liquid mixture?

A) Methyl alcohol and acetone

B) Mercury and alcohol

C) Benzene and water

D) Carbon disulphide and water

72. Which technique is used to separate a solid-solid mixture?

A) Sedimentation   B) Evaporation   C) Distillation   D) Sublimation

73. Fractional crystallization is used to separate which of the following?

A) Two solids   B) Two liquids

C) Two gases   D) A solid and a liquid

74.   Statement –I : Different components of a petroleum is separated by fractional distillation.

Statement – II: Mixture of camphor and sand can be purified by sublimation.

A) Both statements I & II are correct

B) Both statements I & II are incorrect

C) Statement I is correct and statement II is incorrect

D) Statement I is incorrect and statement II is correct

75.   A property not possessed by a fluid is _____.

A) It cant flow   B) it has mass

C) It has definite shape   D) can be perceived by our senses

76.   Which among the following is a solid at room temperature?

A) Nitrogen   B) Potassium permanganate

C) Bromine   D) Helium

77.   Temperature is a measure of _____.

A) total kinetic energy of molecules   B) Ttotal potential energy of molecules

C) average potential energy of molecules   D) average kinetic energy of molecules

78.   As solid melts to form liquid:

A) Inter particle distance increases

B) Inter molecular forces of attraction decreases

C) Compressibility increases

D) All of the above

79.   Which of the following is not characteristic of solid:

A) High Rigidity   B) Regular Shape

C) High density   D) High compressibility

80.   The boiling point of water is:

A) 101 ^{o}C at atmospheric pressure

B) 273K at atmospheric pressure

C) 0 ^{o}C at atmospheric pressure

D) ^{0}K at atmospheric pressure

BIOLOGY

Single Response Type :

81.   Protoplasm means _____

A) Cytoplasm + cell wall   B) Cytoplasm + Nucleus

C) Cytoplasm + Cell membrane   D) Cell wall + Nucleus

82.   The scientist who proposed that all cells arise from pre - existing cell.

A) Rudolf virchow   B) T.Schwann   C) Schleiden   D) Robert Hook

83. A generalised cell consists of following essential parts. They are

A) Cell Membrane   B) Cytoplasm   C) Nucleus   D) All of these

Assertion and Reasoning Type:

84. Assertion : Plastids contain green pigment called chlorophyll.

Reason : Chlorophyll containing plastids are called chromoplast.

A) If both assertion and reason are true and reason is the correct explanation of assertion.

B) If both assertion and reason are true but reason is not the correct explanation of assertion.

C) If assertion is true but reason is false.

D) If assertion is false but reason is true.

Match the following/ Matrix Matching:

85. **Column I**

a) ATP

b) Oxysomes

c) RER

d) 80s

e) Residual bodies

Column II

p) Protein synthesis

q) 60s +40s

r) $F_0 - F_1$ particles 'or' complex

s) Tertiary lysosomes

t) Adenosine –Tri–phosphate

u) 50s + 30s

A) a - p, b - q, c - r, d - s, e - u   B) a - q, b - p, c - r, d - s, e - t

C) a - p, b - q, c - s, d - r, e - p   D) a - t, b - r, c - p, d - q, e - s

86. An example for complex tissue

A) Meristems   B) Xylem   C) Phloem   D) Both B & C

87. In plants guttation takes place through

A) Hydathodes   B) Stomata   C) Lenticels   D) Barks

88. Laticiferous vessels are found in

A) Xylem tissue   B) phloem tissue   C) Cortex   D) None of the above

89. In greek, xylem mean

A) Water   B) Air   C) Wood   D) Food

Assertion and Reasoning Type:

90. **Assertion:** Collenchyma is thick walled tissue.

Reason: Collenchyma is thickened due to deposition of pectin.

A) If both assertion and reason are true and reason is the correct explanation of assertion.

B) If both assertion and reason are true but reason is not the correct explanation of assertion.

C) If assertion is true but reason is false.

D) If asertion is false but reason is true.

91. **Column - 1**   **Column - 2**

    a) Xylem vessels   p) Store food material

    b) Xylem tracheids   q) obliterated lumen

    c) Xylem fibre   r) perforatedvplates

    d) Xylem parenchyma   s) Chisel-like ends

92. Interspecific is

    A) Cross – breeding between different genera.

    B) Cross – breeding between two different varieties

    C) Cross – breeding between two different species of the same genus.

    D) None of these

93. Which one of the following nutrients is not available in fertilizers ?

    A) nitrogen   B) phosphorus   C) iron   D) potassium

94. Find out the correct sentence.

    (i) Hybridizatiom means crossing between genetically dissimilar plants,

    (ii) Cross between two varieties is called as interspecific hybridization,

    (iii) Introducing a gene of desired character into a plant gives genetically modified crop.

    (iv) Cross between plants of two species is called as intervarietal hybridization,

    A) (i) and (iii)   B) (ii) and (iv)   C) (ii) and (iii)   D) (iii) and (iv)

95. Which one is not a source of carbohydrate ?

    A) rice   B) millet   C) sorghum   D) gram

96. Find out the correct sentences about manure,

    (i)   manure contains large quantities of organic matter and small quantities of nutrients.

    (ii) manure increase the water holding capacity of sandy soil.

    (iii) manure helps in draining out of excess of water from clayey soil.

    (iv) excessive use of manure pollutes environment because it is made of animal excretory waste.

    A) (i) and (iii)   B) (i) and (ii)   C) (ii) and (iii)   D) (iii) and (iv).

    Match the following/ Matrix Matching:

97. Match the following with correct response.

    1) Green manure   A) Hydrogen

    2) Vermicomposting   B) Earthworms

    3) Micronutrient   C) Cluster bean

    4) Macronutrient   D) Chlorine

    A) 1 - A, 2 - B, 3 - C, 4 - D   B) 1 - D, 2 - C, 3 - B, 4 - A

    C) 1 - C, 2 - B, 3 - A, 4 - D   D) 1 - B, 2 - C, 3 - D, 4 - A

98. Statement I :The purpose of crop improvement is done only to get higher yield.

Statement II : Plant breeders are concerned with crop improvement.

A) Both statements I and II are correct.

B) Both statements I and II are incorrect.

C) Statement I is correct and statement II is incorrect.

D) Statement I is incorrect and statement II is correct.

99. The use of fertilizers in farming is an example of

A) no-cost production   B) low cost-production

C) high-cost   D) none of these.

100. Materials of biological origin which are commonly used to maintain and improve soil fertility are

A) green manures   B) biofertilizers   C) bioinsecticides   D) both (A) and (B).

****** **ALL THE BEST** ******