LEAD TALENT SEARCH EXAM - LTSE 2019

A Project by LEAD Trust, Bangalore.

ENTRANCE TEST FOR 10TH STANDARD STUDENTS FOR 2 YEAR RESIDENTIAL PU COACHING AT PARTNER INSTITUTIONS FOR COMPETITIVE ENGINEERING / MEDICAL ENTRANCE TESTS

Selected students qualify for freeships/scholarships for admission into Partner Colleges in Karnataka, Kerala and Telangana. The students will be provided extensive coaching for IIT-JEE 2021 / Karnataka CET 2021 / Kerala KEAM 2021 / NEET-UG entrance exams.

NAME OF THE STUDENT :………………………………………………………………

NAME OF THE TEST CENTER :………………………………………………………………

REGISTRATION NUMBER (7-digit code number in OMR) …………………………...…………………

TELEPHONE NUMBER (as mentioned in the application form):………………………………………………….

EMAIL ID (as mentioned in the application form) :…………………………………………………………...

INSTRUCTIONS TO THE CANDIDATE:

1. **This question paper consists of 5 sections out of which only 4 need to be attempted. Sections I, II and III are compulsory. From Sections IV and V, Students opting for Engineering need to attempt Section IV (Maths) and Students opting for Medical need to attempt Section V (Biology).**
    - Section I Physics – 20 questions
    - Section II Chemistry – 20 questions
    - Section III Logical Reasoning – 20 questions
    - Section IV Mathematics – 20 questions
    - Section V Biology – 20 questions
2. Each question contains four alternatives out of which only ONE is correct.
3. Indicate your answers **ONLY** on the OMR sheet. **If you are not attempting Section IV, then leave questions 61 to 80 as blank in OMR sheet. If you are not attempting Section V, then leave questions 81 to 100 as blank in OMR sheet.**
4. **NEGATIVE MARKING:** Each correct answer will be awarded one mark. **And each incorrect answer will reduce ¼ marks**. More than one answer marked against a question will be deemed as an incorrect response and will be negatively marked.

Section I: Physics

1. Density of a body depends upon its
   (a) mass and volume (b) weight and volume
   (c) weight and mass (d) Mass and pressure

2. A ball is thrown vertically upwards with a velocity of 10 m/s. The maximum height that it attains is 'h' and time taken to reach it is 'T' then (h,T) is (assume acceleration due to gravity = 10 m/s^2)
   (a) (10 m, 2 s) (b) (5 m, 1 s) (c) (20 m, 2 s) (d) (10 m, 1 s)

3. A bullet of 20g is horizontally fired with 150ms^{-1} from a pistol of mass 2kg. The recoil velocity of the pistol is
   (a) 1.0 m/s (b) 2.25 m/s (c) 3 m/s (d) 1.5 m/s

4. A force of 5N is applied on an object of mass 5kg placed on smooth floor. The work done by the force on the body in 5 seconds is
   (a) 62.5 J (b) 15 J (c) 25 J (d) 125 J

5. Distance between the two masses is increased to double. The % change in their mutual gravitational force is
   (a) 75% decrease (b) 300% increase (c) 400% increase (d) 400% decrease

6. A lens has a power of 0.5D. The focal length and type of lens is
   (a) -0.4m, concave (b) +0.4m, convex
   (c) -2.0m, concave (d) 2.0m, convex

7. A converging lens has focal length of 15cm. An object of height 5cm is placed at 15cm from the lens. The image will be formed at
   (a) 30cm from the lens (b) 15cm from the lens
   (c) 5cm from the lens (d) No image will be formed

8. Two lamps rated 100W at 220V and 110W at 220V each are connected in series across a 220V power supply. The current drawn from the supply is
   (a) 42/11 A (b) 8/11 A (c) 11/42 A (d) 5/21 A

9. A wire of resistance R is cut into 5 parts and the parts are connected in series to each other. The effective resistance of the resultant combination is
   (a) 5R (b) R/5 (c) 25R (d) R

10. A positively charged particle is moving in opposite direction to the applied magnetic field. The magnetic force on the particle is
(a) along the velocity   (b) along the magnetic field
       (c) perpendicular to magnetic field   (d) zero

11. Total internal reflection is possible when the light ray pass from
(a) air to water   (b) air to glass   (c) glass to water   (d) water to glass

12. A ship rises up as it enters the sea from a river because
(a) sea water is harder than river water
(b) density of sea water is greater than the density of river water
(c) density of sea water is less than density of river water
(d) large quantity of sea water pushes ship upward

13. Two extreme ends of a train moving with constant acceleration pass a pole with velocities u and v respectively. Then the speed with which the mid-point of the train will pass the pole will be
(a) (u+v)/2   (b) $\sqrt{((v^2+u^2)/2)}$ (c) (uv)/2   (d) (v-u)/2

14. Ratio of the masses of body A and B is 1:3 and their kinetic energies are 1:2, then the ratio of their momenta is
(a) 1:1   (b) 1:$\sqrt{3}$ (c) 1:$\sqrt{2}$ (d) 1:$\sqrt{6}$

15. Three resistances 1Ω, 2Ω and 3Ω are given to form an electric circuit. The minimum possible effective resistance using them is
(a) 6 Ω   (b) (6/11) Ω   (c) (11/6) Ω   (d) 1 Ω

16. While catching a ball, a player pulls down his hands to lower the
(a) momentum   (b) impulse   (c) catching time   (d) force

17. Two conducting wires of the same material and of equal lengths and equal diameters are first connected in series and then parallel in a circuit across the same potential difference. The ratio of heat produced in series and parallel combinations would be
(a) 1 : 2   (b) 2 : 1   (c) 1 : 4   (d) 4 : 1

18. Loud sound can travel a larger distance, due to
(a) higher wavelength   (b) higher energy   (c) high frequency   (d) high speed

19. A ball is dropped from a height of 10 m.
(a) Its potential energy increases and kinetic energy decreases during the fall.
(b) Its potential energy is equal to the kinetic energy during the fall.
(c) The potential energy decreases and the kinetic energy increases during the fall.
(d) The potential energy and kinetic energy do not change during the fall.

20. A car moves with a speed of 30 km/h for half an hour, 25 km/h for one hour and 40 km/h for two hours. The average speed of the car is
(a) 34.3 km/h   (b) 44 kmph   (c) 31.7 kmph   (d) 30 kmph

Section II: Chemistry

21. Which of the following is the basis for classification of element in the modern periodic table?
    (a) Number of neutrons in an atom
    (b) Number of protons in an atom
    (c) Sum of the number of proton and neutron
    (d) Sum of the number of electrons and neutrons

22. The element having atomic number 33 belongs to which of the following blocks in the periodic table?
    (a) s
    (b) p
    (c) d
    (d) f

23. Choose the **incorrect** statement among the following
    (a) Electron revolve around the nucleus in a fixed orbits having definite energy and radius
    (b) Electron can jump from one energy level to another
    (c) Electrons follow a spiral path into the nucleus
    (d) Protons and neutron are positioned in the nucleus

24. The number of valence electrons present in an atom of nitrogen is
    (a) 5
    (b) 7
    (c) 3
    (d) 8

25. Which of the following can be used as a method of concentration of ores?
    (a) Calcinations
    (b) Roasting
    (c) Smelting
    (d) Froth floatation

26. The shape of a p-orbital is
    (a) spherical
    (b) dumb-bell
    (c) double dumb-bell
    (d) complex

27. Which of the following is formed by electrostatic force of attraction?
    (a) Ionic bond
    (b) Covalent bond
    (c) Coordinate bond
    (d) All of these

28. If the volume of a given mass of a gas is decreased at constant temperature, the pressure of the gas will
    (a) decrease
    (b) increase
    (c) remain constant
    (d) unpredictable

29. When potassium permanganate crystals are heated potassium manganate, manganese dioxide and oxygen are obtained as the products. This reaction is an example of
    (a) chemical combination
    (b) chemical decomposition
    (c) chemical displacement
    (d) double decomposition

30. Which of the following pairs is isoelectronic?
    (a) Na^+, Ca^{2+}
    (b) O^{2-}, N^{3-}
    (c) Cl^-, Br^-
    (d) Na^+, K^+

31. The metal which does not displace hydrogen from dilute acids is
    (a) Mg
    (b) Zn
    (c) Cu
    (d) Al

32. Which of the following statements is **incorrect**?
    (a) Graphite is a good conductor of electricity
    (b) In a crystal of diamond, each carbon atom is linked to 3 other carbon atom.
    (c) C-60 is an allotropic form of carbon

(d) Graphite finds application as a lubricant in machinery

33. The number of structural isomers of aliphatic hydrocarbons possible for the molecular formula C_5H_{12} is
    (a) 2   (b) 3   (c) 4   (d) 5

34. Which of the following is a component of a souring agent in food preparation?
    (a) Ethanol   (b) Propanone   (c) Ethanoic acid   (d) Propanal

35. In the reaction

    $2K + 2H_2O \rightarrow 2KOH + H_2$

    (a) Potassium gets oxidised   (b) Potassium gets reduced
    (c) Water gets oxidised   (d) No oxidation or reduction is involved.

36. Plaster of paris has the composition

    (a) $CaSO_4.2H_2O$ (b) $CaSO_4.\frac{1}{2}H_2O$ (c) $CaCO_3$ (d) $Na_2CO_3.10H_2O$

37. Which of the following is used to remove permanent hardness?
    (a) washing soda   (b) Baking soda   (c) Boiling   (d) Caustic soda

38. The total number of covalent bonds present in each molecules of chloroethane is
    (a) 4   (b) 5   (c) 6   (d) 7

39. The pH of three solutions A, B and C are 4, 12 and 7 respectively. Choose the correct statement
    (a) B is more acidic than C   (b) A is more acidic than B and C
    (c) B is more acidic than A and C   (d) C is more acidic than A but less acidic than B

40. Which of the following gases is the main cause for global warming?
    (a) O_2 (b) CH_4 (c) CO_2 (d) SO_2

Section III: Logical Reasoning

41. Observe the series and fill the blank with correct number:
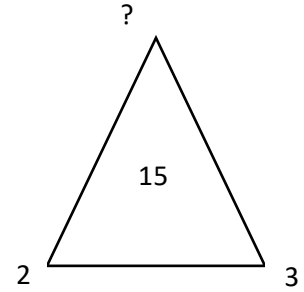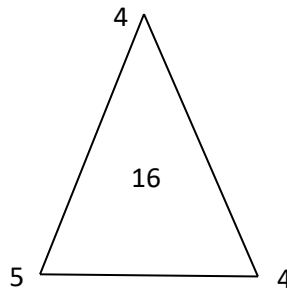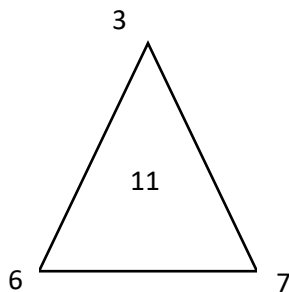
    89, 178, ____, 340, 332, 664.

    (a) 170   (b) 172   (c) 190   (d) 221

42. Ahmed need to complete five set of jobs in 90 hours. Each job would take four hours more to complete than the previous one. How much time would it take to complete the first job?

    (a) 18.5   (b) 18   (c) 12   (d) 10

43. Which number replaces question mark?

    (a) 7   (b) 8   (c) 9   (d) 10

44. Find next number in the series.

    805, 518, 287, 231, 56, ____.
    (a) 176   (b) 175   (c) 16   (d) 12

45. If A is the brother of B; B is the sister of C; and C is the father of D, how D is related to A?

    (a) Brother   (b) Nephew   (c) Sister   (d) Cousin

46. Raju knows more than Arvind. Yasir knows as much as John. Hisham knows less than John. Arvind know more than Yasir. Who is the most knowledgeable person amongst all?

    (a) Raju   (b) Yasir   (c) Arvind   (d) John

47. Among five boys. Ram is heavier than Shubham, but not as heavy as Deepak. Prem is heavier than Dutta, but lighter than Shubham. Who is the heaviest in the group?

    (a) Ram   (b) Shubham   (c) Deepak   (d) Prem

48. If South-West becomes North, South-East becomes West and so on. What will West become?

    (a) South   (b) South-West   (c) North-East   (d) East

49. A 3-digit number 4b4 is subtracted from a 4-digit number 13a5 (which is divisible by 13) to give a 3-digit number 931. Find a and b?

    (a) a=8, b=5   (b) a=7, b=4   (c) a=6, b=3   (d) a=5, b=2

50.   If 5xy5 is a four digit number divisible by 55 then (x-y) is equal to:

(a) -1   (b) 0   (c) 1   (d) 2

51.   A person runs 2km everyday except on Saturdays on which he run 1 km. How many kilometres he would run by 3rd August (including), if he started on 28th May which was a Monday?

(a) 127   (b) 137   (c) 140   (d) 130

52.   A clock is started at noon. By 10 minutes past 4, the hour hand has turned through:

(a) 115°   (b) 120°   (c) 125°   (d) 130°

53.   Which number replaces the question mark?

5, 10, 21, 43, ?, 24, 13, 7
(a) 32   (b) 37   (c) 42   (d) 46

54.   Which of the following diagrams best represents the relation between men, fathers and engineers.

(a)

Men

Fathe

Enginee

(b)

Engine

Fathe

Men

(c)

Me

Father

(d)

Fat

M
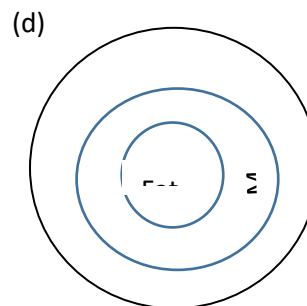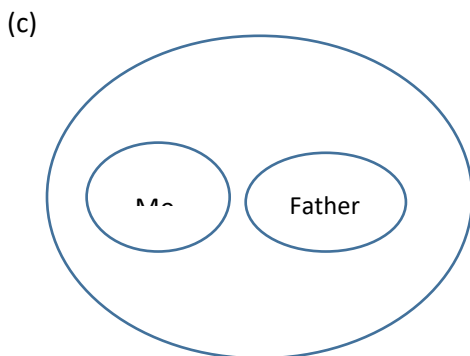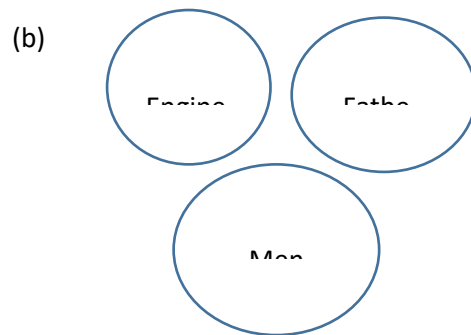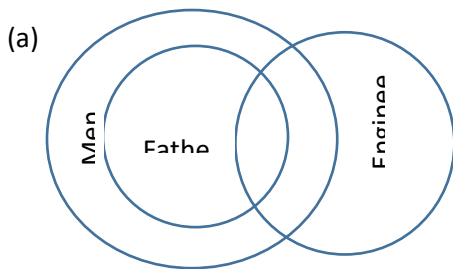
DIRECTIONS FOR QUESTIONS 55 and 56: The letters in each of the following words are coded and written in numbers on the right side of each word, but the numbers do not appear in the same order as the letters in the word. Find out the codes for letters and answer the following questions:

DOG   :   124

GOAT   :   1235

TAG   :   235

DOT   :   145

55.   Which is the code for letter A?

        (a) 2   (b) 3   (c) 4   (d) 5

56.   What would be the code (**in correct order**) for the word OAT?

        (a) 315   (b) 235   (c) 135   (d) 325

DIRECTIONS FOR QUESTIONS 57-60: Study the following information carefully and answer the questions given below it.

Six friends P, Q, R, S, T and U are members of a club and play a different game of Football, Cricket, Tennis, Basketball, Badminton and Volleyball.
T who is taller than P and S plays Tennis.
The tallest among them plays Basketball.
The shortest among them play Volleyball.
Q and S neither play Volleyball nor Basketball.
R plays Volleyball.
T is the only person between Q who plays Football and P in order of height.

57.   Who among them is taller than R but shorter than P ?

        (a) Q   (b) S   (c) U   (d) T

58.   Who will be at the third place if they are arranged in the descending order of their height ?

        (a) Q   (b) P   (c) S   (d) T

59.   What does S play ?

        (a) Either cricket or Badminton   (b) Football

        (c) Basketball   (d) Cricket

60.   Who among them plays Basketball ?

        (a) Q   (b) R   (c) S   (d) U

Section IV: Mathematics

61. Following is the graph of $y = p(x)$, where $p(x)$ is a polynomial. The value of the polynomial when x = 4 is
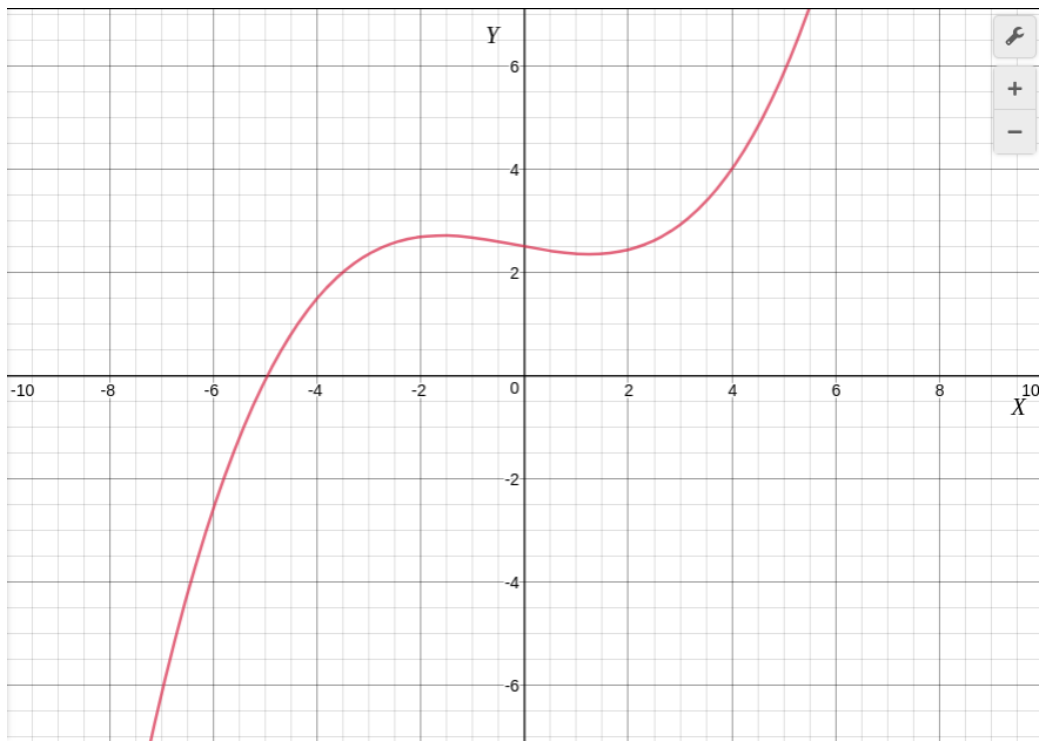
    (a) 0   (b) 4   (c) 2.5   (d) 2

62. Find angle BOC in the following figure. All angles are in degrees.

    (a) 30

    (b) 60

    (c) 90

    (d) 120
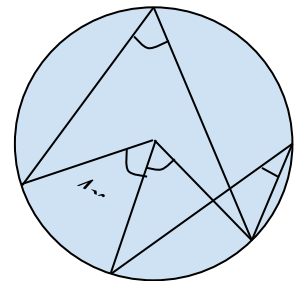
63. The coordinates of the vertices A, B and C of the $\triangle ABC$ are (1, 0), (3, 0) and (0, 2) respectively. Area of the triangle is

    (a) 1 unit   (b) 2 units   (c) 3 units   (d) 4 units

64. Which of the following is false for all x in the range $0 \le x \le 90$?

    (a) $sin\ x° \le 1$ (b) $cos\ x° \le 1$

    (c) $cosec\ x° \le 1$ (d) $tan\ x° \ge 0$

65. Which of the following is a false statement?

(a) Every rational number is a real number

(b) Every point on the number line is of the form $\sqrt{m}$, where m is a natural number

(c) Every irrational number is a real number

(d) -5 and -9 are coprime integers

66. A die is thrown twice. What is the probability that 6 will not come up either time

(a) $\dfrac{11}{36}$ (b) $\dfrac{12}{36}$ (c) $\dfrac{24}{36}$ (d) $\dfrac{25}{36}$

67. The fraction which bears the same ratio to $\dfrac{1}{27}$ that $\dfrac{3}{7}$ has with $\dfrac{5}{9}$ is
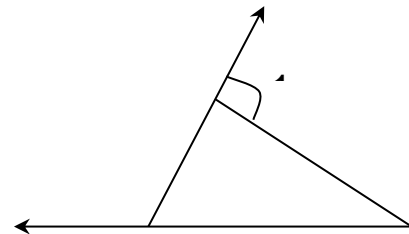
(a) $\dfrac{1}{35}$ (b) $\dfrac{1}{42}$ (c) $\dfrac{1}{49}$ (d) $\dfrac{1}{52}$

68. If $2^{x-1} + 2^{x-2} + 2^{x-3} = 448$ then value of $x^2 - x + 2$ is

(a) 80   (b) 81   (c) 74   (d) 72

69. In the given figure, $\angle PQR$ and $\angle PRQ$ are in the ratio $4:3$, then $\angle PQT =$

(a) $60°$
(b) $120°$
(c) $45°$
(d) $135°$

70. The value of $cos(40° + \theta) - sin(50° - \theta) + \dfrac{cos^2 40° + cos^2 50°}{sin^2 40° + sin^2 50°}$ is

(a) 0 (b) -1 (c) 1   (d) None of these

71. If two poles 20 m and 80 m high are 100 m apart, then the height of the point of intersection of the lines joining the top of each pole to the foot of the opposite pole is

(a) 10 (b) 16 (c) $\sqrt{13}$ (d) 15

72. If the median of the following series of observations is 40. Then the value of x is

30, 31, 35, x, x+2, 45, 48, 49

(a) 41   (b) 39   (c) 42   (d) 43

73. In a triangle ABC, AD is the median through A and E is the mid-point of AD and BE produced meets AC at F. Then AF is equal to

(a) $\dfrac{1}{5}AC$ (b) $\dfrac{1}{4}AC$ (c) $\dfrac{1}{3}AC$ (d) $\dfrac{1}{2}AC$

74. Quadratic equation $x^2 + bx + c = 0$ has a root $3 - 2\sqrt{3}$. If b and c are real rational numbers, find the value of c.
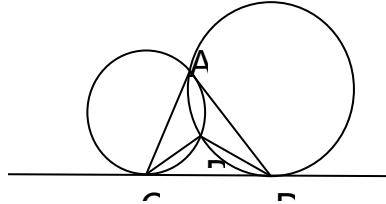
(a) *3* (b) $3\sqrt{3}$ (c) $-3\sqrt{3}$ (d) -3

75. If the pth term of an A.P. is $\dfrac{1}{q}$ and q^{th} term is $\dfrac{1}{p}$, then sum of first pq terms is

(a) $\dfrac{1}{3}(pq-1)$ (b) $\dfrac{1}{3}(pq+1)$ (c) $\dfrac{1}{2}(pq+1)$ (d) $\dfrac{1}{2}(pq-1)$

76. Two circles intersect in A and B. CD is a direct common tangent touching the circles at C and D. If $\angle CAD = 50°$ then $\angle CBD =$

(a) *110°*

(b) *120°*

(c) *130°*

(d) *150°*

77. If one of the zeroes of the cubic polynomial $x^3 + ax^2 + bx + c$ is 0 then the sum of the other two zeroes is

(a) 0 (b) a (c) b (d) $-a$

78. The curved surface of area of a frustum of cone of radii r_1 and r_2 and height h equals $\pi l(r_1 + r_2)$. Then $l^2 =$

(a) $h^2 + r_1{}^2 + r_2{}^2$ (b) $h^2 + (r_1 - r_2)^2$

(c) $h^2 - (r_1 - r_2)^2$ (d) $(h-r_1)^2 + (h-r_2)^2$

79. On dividing $x^3 - 3x^2 + x + 2$ by a polynomial $g(x)$, the quotient and the remainder were (x-2) and (-2x+4) respectively, then the polynomial $g(x)$ is equal to

(a) $x^2 - x + 1$ (b) $x^2 + x + 1$ (c) $x^2 + x - 1$ (d) $x^2 - x - 1$

80. Find sum of the angles, $\sum_{i=1}^{12}\ (\angle i)$, in the diagram given below:

(a) *540°*

(b) *1440°*

(c) *1080°*

(d) *720°*
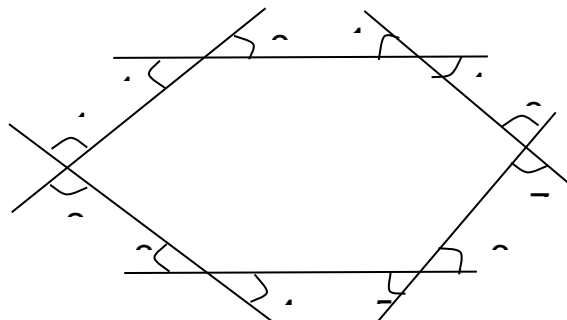
Section V: Biology

81. Where do certain symbiotic microorganisms normally occur in human body?

    (a) Caecum   (b) oral lining and tongue surface

    (c) vermiform appendix and rectum   (d) duodenum

82. Nymphs are the young ones of organisms which belongs to the _____

    (a) Echinodermata   (b) Annelida   (c) Chordata   (d) Arthropoda

83. Priyanka took a destarched potted plant and set-up an experiment as shown in the figure. She left the plant in Sunlight for few hours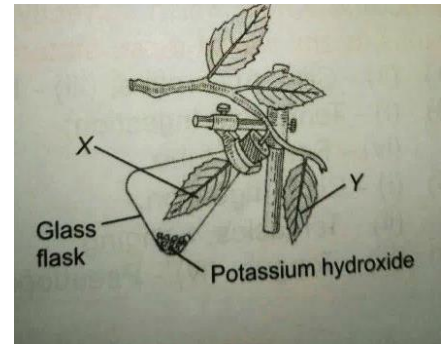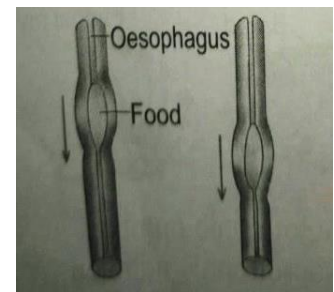 and then tested the leaves X & Y for starch. Leaf X did not give starch test while leaf Y Showed presence of starch. What is proved by this Experiment?

    (a) Chlorophyll is necessary for photosynthesis
    (b) Carbon dioxide is necessary for photosynthesis
    (c) Light is necessary for photosynthesis
    (d) Oxygen is given out during photosynthesis

84. The Nictitating membrane of eye, wisdom tooth and tail in humans are the examples of _____

    (a) Homologous organs   (b) Analogous organs
    (c) digestive organs   (d) vestigial organs

85. Method used to determine the age of a fossil is
    (a) relative dating   (b) carbon dating   (c) half-life period   (d) uranium dating

86. The vitamin which is required for the absorption of iron is
    (a) vitamin A   (b) vitamin C   (c) vitamin D   (d) vitamin K

87. The given figure shows the movement of food through the Oesophagus. This movement is aided by the muscles of the Oesophagus in a wave like action called
    (a) Muscularisation   (b) Diapedesis
    (c) Peristalsis   (d) Rumination

88. The _____ flowers are very small, dull, have no nectar & are not scented.
    (a) Insect pollinated   (b) water pollinated
    (c) wind pollinated   (d) Schleiden

89. During heavy Exercise, we get cramps in the legs due to accumulation of _____
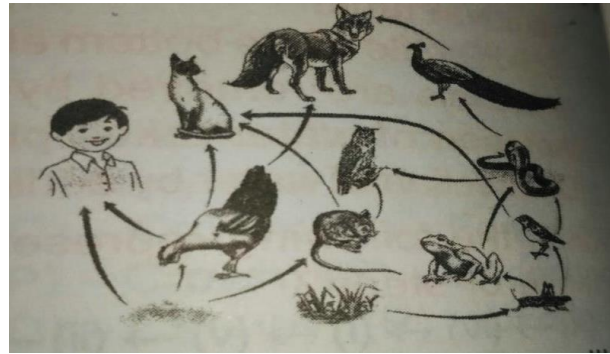
(a) carbon dioxide   (b) acetic acid   (c) lactic acid   (d) carbon monoxide

90. Which of the following happen if the population of snakes is increased in the given food web?

(a) The population of frog will increase.
(b) The population of peacock will decrease.
(c) There will be no effect on the population of hen.
(d) The population of grasshopper will increase.

91. Select the incorrect statement
(a) Phloem tubes are only found in the leaves of plants as this is where the sugars are made.
(b) Volume of blood in an average human adult is 10 liters.
(c) Blood contains many more white blood cells than the red blood cells.
(d) All of these

92. Match column I with column II and select the correct option from the codes given below.

	Column I		Column II
(a)	Partial Parasitic Plant	(i)	Dionaea
(b)	Total Parasitic Plant	(ii)	Cuscuta
(c)	Insectivorous plant	(iii)	Mistletoe
(d)	Symbiosis	(iv)	Mycorrhiza
(e)	Saprotroph	(v)	Pseudomonas

(a) (a)- (ii) ; (b) – (iii) ; (c) –(i) ; (d)-(iv) ; (e)- (v)
(b) (a)- (iii) ; (b) – (ii) ; (c) –(i) ; (d)-(iv) ; (e)- (v)
(c) (a)- (i) ; (b) – (ii) ; (c) –(iv) ; (d)-(iii) ; (e)- (v)
(d) (a)- (iii) ; (b) – (v) ; (c) –(ii) ; (d)-(i) ; (e)- (iv)

93. Which of the following statements are incorrect regarding the given animals?
(i) both X & Y possess streamlined body & webbed feet
(ii) both are good swimmers
(iii) Y has a thick layer of fat under its skin with fur on its body. While X has thick skin & a layer of fat under its skin.
(iv) both live together to keep themselves warm.
(v) Y has very strong sense of smell unlike X.
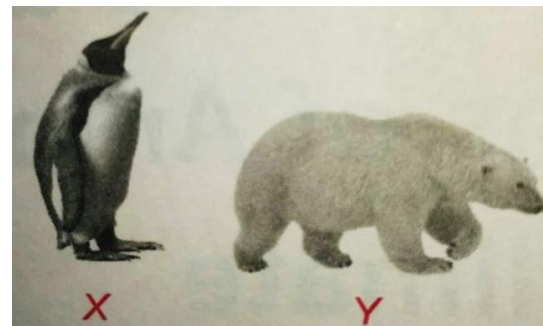
(a) (ii) & (iv) only   (b) (i), (ii) & (iv) only

(c) (ii), (iii) & (v) only   (d) (iv) only

94. Read the given paragraph carefully.

The female silk **(i)** lays eggs. When an egg hatches, a tiny caterpillar called silkworm or **(ii)** crawls out. It feeds on leaves & grows. When it is ready to enter the next stage in its life cycle, it secretes a fibre made of **(iii)**, which hardens on exposure to air this is the silk fibre. It covers itself completely with this fibre, to form a **(iv)** at this stage, the larva is called a **(v)** which grows and changes inside the covering and a few weeks later comes out as an adult. Select the correct sequence of words to complete the above paragraph.

	(i)	(ii)	(iii)	(iv)	(v)
(a)	Moth	Larva	Protein	Pupa	Cocoon
(b)	Larva	Moth	Carbohydrate	Cocoon	Pupa
(c)	Moth	Larva	Protein	Cocoon	Pupa
(d)	Moth	Larva	Fat	Cocoon	Pupa

95. The fishes which excretes NH3 in the form of excretory waste are known as _____

(a) uricotelic   (b) ammonotelic   (c) ureotelic   (d) nitrotelic

96. Right atrium receives blood from

(a) pulmonary artery   (b) pulmonary veins   (c) aorta   (d) venae cavae

97. Refer to the given flow chart & select the option which correctly identifies X, Y & Z
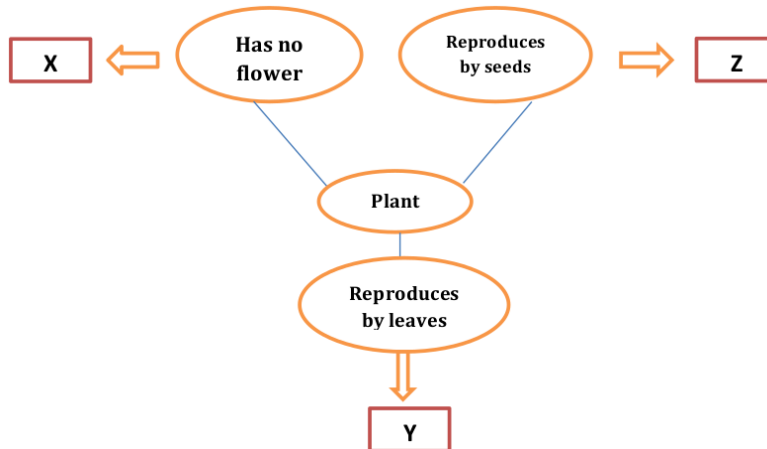
	X	Y	Z
(a)	Moss	Bryophyllum	Maize
(b)	Moss	Pineapple	Begonia
(c)	Bryophyllum	Begonia	Moss
(d)	Moss	Papaya	Pineapple

98. The lizard is well-adapted to live in humans dwelling. Which function of its adaptations is incorrectly described?

	Adaptation	Function
(a)	Long , sticky tongue	To catch fast-moving prey
(b)	Long, narrow & flat body	To crawl between narrow crevices & spaces easily
(c)	Sticky pads on the underside of the feet.	To walk on walls & ceilings without falling
(d)	Tail that can drop off & wriggles for a while	To attract mates for reproduction

99. Which of the following is not a function of large Intestine?
    (a) Absorption of water, vitamins & mineral ions
    (b) digestion of food
    (c) decomposition of cellulose by bacteria
    (d) temporary storage of faeces in rectum

100. The cells shown in the figure can be found in the blood. Which of the following statements is/are correct regarding these cells?

    (i) They do not have nucleus
    (ii) They help the body to fight against infections
    (iii) They help the body to clot
    (iv) They help to transport oxygen

    (a) (i) & (ii) only   (b) (ii) only   (c) (i) , (ii) & (iii) only   (d) (i) , (iii) & (iv) only

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Space for Rough Work

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Space for Rough Work