Maximum Marks: 80 **Time allowed: 150 mins**

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) ……...……

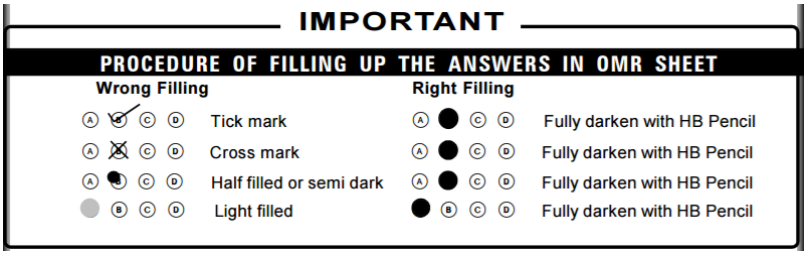
TELEPHONE NUMBER (as mentioned in the application form):…….

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.

5. Use of Calculators, Smartphones and Electronic devices is NOT allowed.



Section I: Physics

1. The measure of motion of a body is
(a) Speed (b) velocity (c) momentum (d) Inertia

2. A ball is dropped gently from a building 20m high. The velocity with which it strikes the ground is 'v' and time taken to strike is 'T' then (v,T) is (assume acceleration due to gravity = 10 m/s^2)
(a) (10 m/s, 2 s) (b) (20 m/s, 3 s) (c) (20 m/s, 2 s) (d) (10 m/s, 3 s)

3. A bullet of 20g is horizontally fired with 150ms^{-1} from a pistol of mass 2kg. The recoil kinetic energy of the pistol is
(a) 1.5 J (b) 2.25 J (c) 3 J (d) 0.45 J

4. Two objects each of mass 1.5kg are moving along same line towards each other with speeds 2.5ms^{-1} each before they collide. After the collision they stick to each other. The velocity of combined system just after the collision is
(a) 2.5 ms^{-1} (b) 5.0 ms^{-1} (c) 2.0 ms^{-1} (d) 0.0 ms^{-1}

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

6. A lens has a power of -2.5D. The focal length and type of lens is
(a) -0.4m, concave (b) +0.4m, convex
(c) -2.5m, concave (d) 2.5m, convex

7. Concave lens has focal length of 15cm. The image is formed at 10 cm from the lens. The object distance is
(a) 30cm from the image (b) 30 cm from the lens
(c) 15 cm from the lens (d) 15 cm from the image

8. Two lamps rated 100W at 220V and 60W at 220V each are connected in parallel across a 220V power supply. The current drawn from the supply is
(a) 2/11 A (b) 8/11 A (c) 11/8 A (d) 11/2 A

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

10. At the time of short circuit, the current in the circuit
(a) reduces substantially (b) does not change

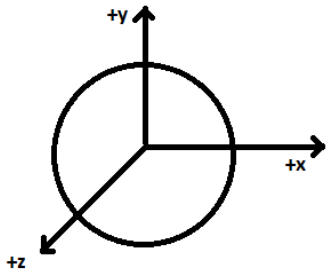
(c) increase heavily (d) varies continuously

11. A circular coil of copper wire is rotated in a uniform magnetic field. The direction of induced current changes once in each
(a) quarter revolution of coil (b) half revolution of coil
(c) 1 revolution of coil (d) 2 revolutions of coil

12. A particle moving along circular path reaches a diametrically opposite point. The ratio of its average speed to the magnitude of average velocity is
(a) 1:1 (b) 2: π (c) π : 2 (d) insufficient data provided

13. A loop whose plane lies in xy plane (as shown in figure) is rotated by a small angle in clockwise sense as seen from positive y axis. If a uniform magnetic field exist in the direction towards negative z axis then the direction of induced current in the loop as viewed from positive z axis is

(a) clockwise
(b) Anticlockwise
(c) can be (a) or (b)
(d) zero

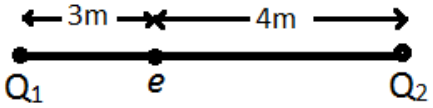


14. If two pieces of different metals completely immersed in water experiences equal up thrust, then
(a) both pieces have equal weights in air (b) both pieces have equal density
(c) both pieces have equal volumes (d) both are immersed at the same depth

15. Two blocks of unequal masses m_1=4kg and m_2= 8kg are moving with velocities v_1=10m/s and v_2=5m/s respectively. The net forces on m_1 and m_2 required to keep them moving with their velocities are F_1 and F_2 respectively. Then
(a) F1 > F2 (b) F2 > F1 (c) F1 = F2 ≠ 0 (d) F1 = F2 = 0

16. A person is stuck on a frictionless surface and cannot exert any horizontal force against the surface. He should get off by
(a) running (b) rolling (c) jumping (d) spitting or coughing

17. An electron is placed in between two fixed charges of magnitude Q_1 and Q_2 are as shown. The net force on the electron is zero. Then
(a) $Q_1 = Q_2$
(b) $3Q_1 = 4Q_2$
(c) $16Q_1 = 9Q_2$
(d) $9Q_1 = 16Q_2$



18. A sound wave is
(a) Non mechanical and longitudinal wave (b) mechanical and transverse wave
(c) Mechanical and longitudinal wave (d) Non mechanical and transverse wave

19. The temperature at which Celsius and Fahrenheit scale have equal values is
(a) 60 ^{o}C (b) -60 ^{o}C (c) 40 ^{o}C (d) -40 ^{o}C

20. A person travels from A to B. if she first travels at an average speed of 12kmph for 10km, then at 8kmph for another 1.25hrs. The average speed of the entire trip is
(a) 3.2 kmph (b) 4.4 kmph (c) 9.6 kmph (d) 19.2 kmph

Section II: Chemistry

21. Sodium can combine with chlorine to form sodium chloride. In this reaction,
(a) sodium gets reduced (b) sodium gets oxidised
(c) chlorine gets oxidised (d) chlorine functions as a reducing agent

22. When an iron nail is placed in a solution of copper sulphate, copper gets deposited on the nail. This reaction is an example of
(a) chemical combination (b) chemical decomposition
(c) chemical displacement (d) double decomposition

23. Which of the following is an amphoteric oxide?
(a) SO_2 (b) CaO (c) ZnO (d) NO

24. If the formula of a compound is NaZ, which of the following is correct?
(a) MgZ_2 (b) Mg_2Z (c) MgZ (d) KZ_2

25. When a solution of silver nitrate is added to a solution of sodium chloride, a white precipitate of silver chloride is obtained. This reaction involves
(a) oxidation (b) reduction
(c) both oxidation and reduction (d) neither oxidation nor reduction

26. Urea has the molecular formula NH_2CONH_2 (N=14, C=12, O=16 and H=1). 240g of urea will be
(a) 40 moles (b) 4 moles (c) 60 moles (d) 240 moles

27. The molar mass of a divalent metal oxide is 40. (O=16 and Cl=35.5). The molar mass of its chloride will be
(a) 40 (b) 59.5 (c) 95 (d) 35.5

28. 1.1g of CO_2 will contain approximately
(a) 6×10^{23} molecules (b) 1.5×10^{23} molecules
(c) 1.5×10^{22} molecules (d) 6×10^{22} molecules

29. A hydrocarbon which is used for cutting and welding metals is
(a) ethane (b) ethyne (c) ethene (d) methane

30. The total number of covalent bonds present in each molecule of ethene is
(a) 5 (b) 6 (c) 7 (d) 4

31. Saponification is used for the manufacture of
(a) glass (b) textiles (c) soap (d) plastic

32. An ore of iron is
(a) haematite (b) bauxite (c) cinnabar (d) galena

33. The long form of the periodic table contains……..periods and …….groups
(a) 8, 12 (b) 7, 18 (c) 7, 8 (d) 4, 7

34. The number of valence electrons present in each atom of oxygen is
(a) 16 (b) 8 (c) 6 (d) 32

35. The reaction between a carboxylic acid and an alcohol is called
(a) esterification (b) neutralisation
(c) saponification (d) redox reaction

36. If a small quantity of an acid is added to water the pH will
(a) increase (b) decrease
(c) remain constant (d) be unpredictable

37. Baking soda is
(a) $Na_2CO_3.10H_2O$ (b) Na_2CO_3
(c) $NaHCO_3$ (d) NaOH

38. Which of the following will undergo substitution with chlorine?
(a) methane (b) ethene
(c) ethyne (d) propene

39. If the pressure of a given mass of a gas is increased at a given temperature, the volume of the gas will
(a) also increase (b) decrease
(c) remain same (d) none of these

40. The element having atomic number 24 belongs to…….block of the Periodic Table.
(a) s (b) p (c) d (d) f

Section III: Logical Reasoning

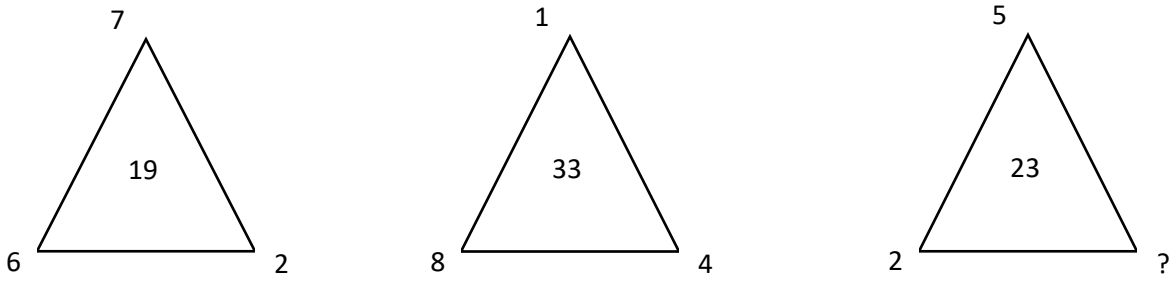
41. Observe the series and fill the blank with correct number:

664, 332, 340, 170, ___, 89.
(a) 85 (b) 97 (c) 109 (d) 178

42. The sum of the ages of five children born at intervals of five years each is 100 years. What is the age of the middle child?

(a) 15 (b) 20 (c) 25 (d) 26

43. Which number replaces question mark?



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

44. Find next number in the series.

806, 519, 287, 232, 55, ___.
(a) 27 (b) 25 (c) 177 (d) 175

45. Anil has a brother Deepak. Anil is the son of Prem. Vimal is Prem's father. How is Deepak related to Vimal?

(a) Brother (b) Nephew (c) Father (d) Grand son

46. In a football match Prem scored more than Hisham but less than Tom. Robin scored less than Roshan but more than Tom. Whose score was the lowest in the match?

(a) Hisham (b) Robin (c) Prem (d) Tom

47. Ram is taller than Shubham but not as tall as Deepak. Shubham is taller than Prem. Deepak is not as tall as Rohan who among them is the tallest?

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

48. A boy started from his home. After walking 5 km towards east, he turned to his right and walked for 8km. Then he again turned to his right and walked for 10 km. In which direction is he from his house?

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

49. A 3-digit number 4a3 is added to another 3-digit number 984 to give a 4-digit number 13b7, which is divisible by 11. Find a and b?

(a) a=3, b=7 (b) a=5, b=5 (c) a=2, b=8 (d) a=1, b=9

50. If 6xy5 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 2 km every day except on Sundays on which he runs 1 km. How many kilometre he would run by 5th August (including), if he started on 28th May which was a Monday?

(a) 131 (b) 141 (c) 140 (d) 130

52. The acute angle between the minute hand and the hour hand of a clock, when the time is 4.20 AM, is:

(a) 0° (b) 5° (c) 10° (d) 20°

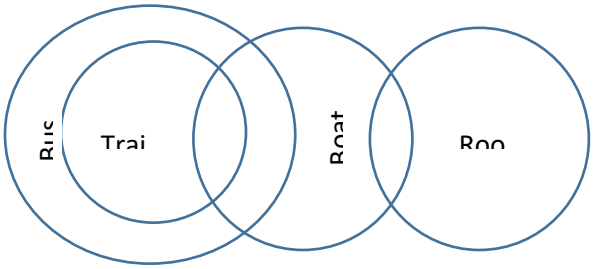
53. Which number replaces the question mark?

4, 7, 15, 31, ?, 19, 11, 6
(a) 35 (b) 36 (c) 40 (d) 41

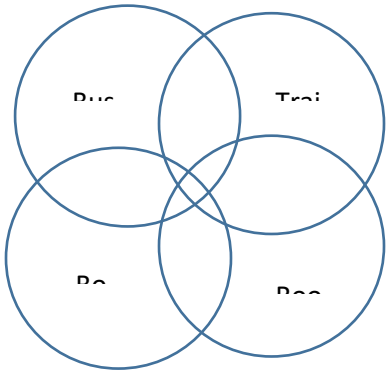
54. Analyze following diagrams and find out the diagram which accurately represents the given statement.

STATEMENT: No room is trains, No boats are buses and all trains are buses

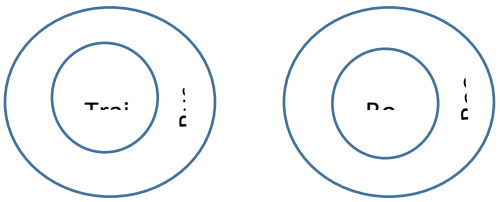
(a)



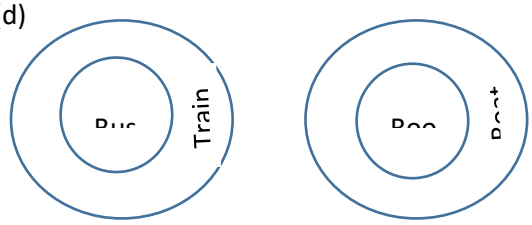
(b)



(c)



(d)



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

KING : bdme

RING : deob

INK : emb

IRK : oem

55. Which is the code for letter K?

(a) e (b) m (c) d (d) b

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

(a) emb (b) mbe (c) ome (d) meb

DIRECTIONS FOR QUESTIONS 57-60: Study the following information carefully and answer the questions given below it. Shyam, Raheem, Isaac, Hamza and Rohan help themselves to take some sweets from bowl. Four of them each take a gulab jamun. Raheem and Hamza do not take a burfi as all the other do. Infact Raheem takes only one sweet, which is a laddu. Apart from Raheem, only Shyam and Rohan do not take peda.

57. Who are the two people taking the same number and same type of sweets?

(a) Shyam and Isaac (b) Hamza and Rohan (c) Rohan and Isaac (d) Shyam and Rohan

58. Who took three sweets?

(a) Isaac (b) Raheem (c) Rohan (d) Shyam

59. Who only had peda and gulab Jamun?

(a) Shyam (b) Raheem (c) Rohan (d) Hamza

60. In total how many pieces of sweets were taken by the group?

(a) 12 (b) 11 (c) 10 (d) 9

Section IV: Mathematics

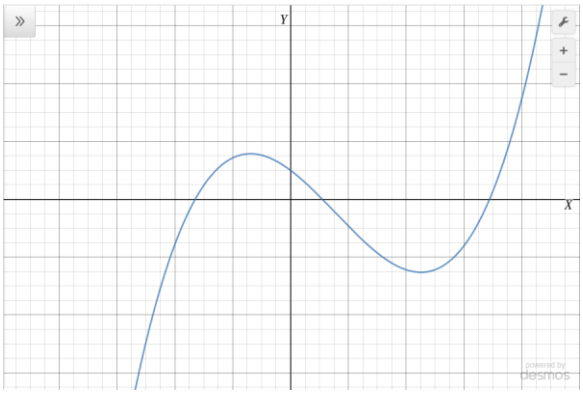
61. Following is the graph of $y = p(x)$, where $p(x)$is a polynomial. The number of zeroes of $p(x)$is

(a) 3

(b) 2

(c) 0

(d) 4



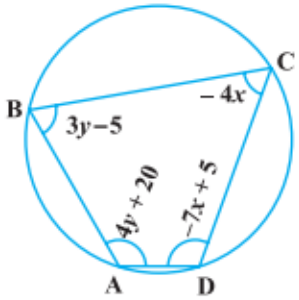
62. ABCD is a cyclic quadrilateral. Find the angle A of the cyclic quadrilateral

(a) 80

(b) 100

(c) 110

(d) 120



63. The coordinates of the vertices A and B of the ΔABC are (2, 3), (-2, 1) respectively. The coordinates of the centroid is (1, $\frac{2}{3}$). The coordinates of the vertex C are

(a) (0, 2) (b) (1, -2) (c) (2, -3) (d) (3, -2)

64. The value of $cos\ x° - sin\ x°$ $(0 \leq x < 45)$ is

(a) 0 (b) positive

(c) negative (d) sometimes positive sometimes negative

65. Which of the following is a false statement?

(a) Every positive odd integer is of the form $2q + 1$, where q is some non-negative integer

(b) Every positive odd integer is of the form $4q + 1$ or $4q + 3$, where q is some integer

(c) Every positive odd integer is of the form $6q + 1$ or $6q + 3$ or $6q + 5$, where q is some non-negative integer

(d) -5 and -9 are coprime integers

66. In a deck of 52 cards, there are 4 suits (heart, diamond, spade, and club) of 13 cards each. Each suit has cards called ace, king, queen and jack, remaining 9 cards are numbered from 2 to 10. A card is drawn at random from a well-shuffled deck of 52 cards. The probability that the card is neither a heart nor a king is

(a) $\frac{9}{13}$ (b) $\frac{17}{52}$ (c) $\frac{35}{52}$ (d) $\frac{4}{13}$

67. There is a circular path around the sports field. Maryam takes 20 minutes to drive one round of the field, while Ahmad takes 15 minutes for the same. Suppose they both start at the same point and the same time, and go in the same direction. After how many minutes will they meet again at the starting point?

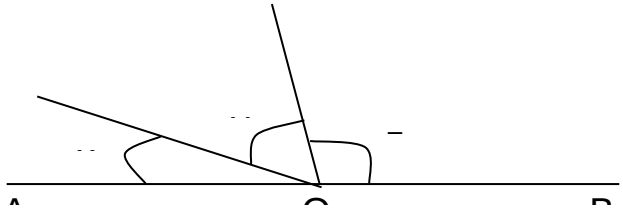
(a) 60 minutes (b) 30 minutes (c) 300 minutes (d) 90 minutes

68. If $2^m - 2^{m-1} = 4$ then value of m^m

(a) 4 (b) 27 (c) 6 (d) 64

69. In the given figure, AOB is a straight line. If $x : y : z = 4 : 5 : 6$, then y =

(a) 60°
(b) 80°
(c) 48°
(d) 72°



70. The value of $\frac{cos^2\theta + tan^2\theta - 1}{sin^2\theta}$ is

(a) 0 (b) $cos^2\theta$ (c) $tan^2\theta$ (d) $\frac{1}{sin^2\theta}$

71. A vertical pole of height 10 metres stands at one corner of a rectangular field. The angle of elevation of its top from the farthest corner is 30°, while that from another corner is 60°. The area (in m^2) of rectangular field is

(a) $\frac{200\sqrt{2}}{3}$ (b) $\frac{400}{\sqrt{3}}$ (c) $\frac{200\sqrt{2}}{\sqrt{3}}$ (d) $\frac{400\sqrt{2}}{\sqrt{3}}$

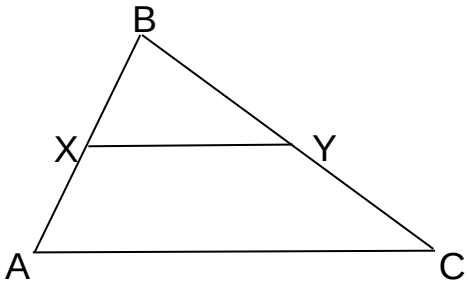
72. The mean weight of 150 students in a class is 60 kg. The mean weight of the boys is 70 kg while that of girls is 55 kg. Find the difference of number of boys and girls.

(a) 25 (b) 50 (c) 75 (d) 100

73. In the given figure, XY is parallel to AC and divides the triangle ΔABC into the two parts of equal area. Then the ratio $AX : AB$ equals

(a) $\frac{\sqrt{2}+1}{2}$ (b) $\frac{2-\sqrt{2}}{2}$

(c) $\frac{\sqrt{2}-1}{2}$ (d) $\frac{2+\sqrt{2}}{2}$



74. The value of k so that the equations $2x^2 + kx - 5 = 0$ and $x^2 - 3x - 4 = 0$ have one root in common are

(a) $3, \frac{27}{2}$ (b) $9, \frac{27}{4}$ (c) $-3, \frac{-27}{4}$ (d) $-3, \frac{4}{27}$

75. Let us consider the following two arithmetic progressions with 100 elements in each

A: 5, 8, ...
B: 3, 7, …
How many common elements are there in the AP sequences A and B?
(a) 33 (b) 50 (c) 30 (d) 25

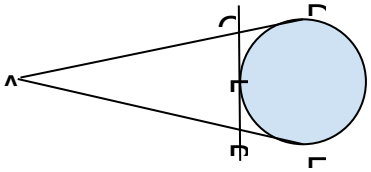
76. In the figure given below, AD, AE and BC are tangents to the circle at D, E, F respectively. Then

(a) 4AD = AB + BC + AC

(b) 3AD = AB + BC + AC

(c) 2AD = AB + BC + AC

(d) AD = AB + BC + AC



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

(a) 0 (b) a (c) b (d) c

78. There is a right circular cone of height h and vertical angle 60°. A sphere when placed inside the cone, it touches the curved surface and the base of the cone. The volume of the sphere is

(a) $\frac{4}{3}\pi h^3$ (b) $\frac{4}{9}\pi h^3$ (c) $\frac{4}{27}\pi h^3$ (d) $\frac{4}{81}\pi h^3$

79. If the polynomial $x^4 - 6x^3 + 16x^2 - 25x + 10$ is divided by another polynomial $x^2 - 2x + k$, the remainder comes out to be $x + a$, then the value of a is

(a) -1 (b) -5 (c) 1 (d) 5

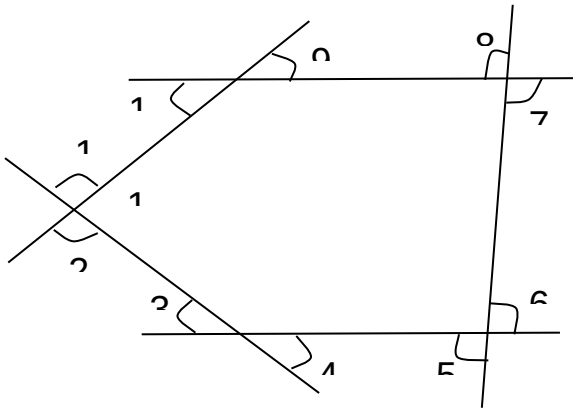
80. Find sum of the angles, $\sum_{i=1}^{10} (\angle i)$, in the diagram given below:

(a) 540°

(b) 360°

(c) 1080°

(d) 720°



Section V: Biology

81. Pulmonary _____ carries _____ rich blood from the heart to the lungs and pulmonary _____ carries _____ rich blood from the lungs to the heart.

(a) vein, oxygen, artery, carbon dioxide
(b) artery, carbon dioxide, vein, oxygen
(c) artery, oxygen, vein, carbon dioxide
(d) vein, carbon dioxide, artery, oxygen

82. Select the incorrect statements.

(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 litres.

(c) Blood contains many more white blood cells than red blood cells.

(d) all of these.

83. Ruchi collected four different kinds of seeds (W, X, Y & Z). The characteristic of each seed is given. Identify the seeds and the agent of their dispersal & select the correct option.

W - Surrounded by tiny hair
X - thick coat of fibres
Y - Presence of hooks or spines
Z - Enclosed in a fruit that burst open when mature.

	Seed	Agent of Dispersal
(a)	W-Dandelion	Animals
(b)	X-Coconut	Water
(c)	Y-Xanthium	Air
(d)	Z-Lotus	Explosion

84. Which of the following is the correct path of oxygen in humans during inhalation?
(a) Nostrils → Nasal Cavity → Pharynx → Bronchi → Trachea → Bronchiole → Alveoli
(b) Nostrils → Nasal Cavity → Pharynx →Trachea→Bronchi→Bronchiole → Alveoli
(c) Nostrils → Nasal Cavity →Trachea→Pharynx → Bronchi →Bronchiole → Alveoli
(d) Nostrils → Nasal Cavity →Pharynx →Trachea →Alveoli→ Bronchi →Bronchiole

85. Select the correct sequence of words to complete the given passage.
The Pharynx actually has two apertures, one opening into the wind pipe & the other into the _____. The aperture opening into the wind pipe is grounded by _____. It closes the wind pipe when you take _____ .
(a) oesophagus, uvula, food
(b) stomach, epiglottis, food
(c) oesophagus, epiglottis, food
(d) liver, uvula, water

86. The parts of human excretory system are given below:
(i) Bladder (ii) Kidney (iii) Ureter (iv) Urethra
In which order does urine pass through these structures?
(a) (ii) →(iii) → (i) → (iv)
(b) (i) → (iii) → (iv) → (ii)
(c) (ii) →(iv) → (i) → (iii)
(d) (iv) → (iii) → (i) → (ii)

87. Dinosaurs dominated the earth about
(a) 10 million years ago (b) 50 million years ago
(c) 150 million years ago (d) 500 million years ago

88. The idea 'omnicellula –e- cellula' which means that all living cells arise from pre-existing cells was given by
(a) Robert Brown (b) Purkinje (c) Rudolf Virchow (d) Schleiden

89. Which one of the following disease is not caused by bacteria?
(a) Anthrax (b) Typhoid (c) Tuberculosis (d) Malaria

90. Identify the incorrect sentence:
(a) Parenchymatous tissues have intercellular space.
(b) Collenchymatous tissues are irregular.
(c) Apical and intercalary meristems are permanent tissues.
(d) Meristematic tissues, in its early stages, lack vacuoles.

91. The structural and functional unit of Nervous system is
(a) Nephron (b) Neuron (c) Neophron d) Ganglion

92. A person put warm water in an aquarium, thinking that the fish would be more comfortable in it. However, the fish died. What can be the reason for this?
(a) The concentration of oxygen decreases in warm water.
(b) The concentration of carbon dioxide increases in warm water.
(c) Fish cannot bear the extreme heat of the water.
(d) All of these.

93. When a person breathes in, what happens to the diaphragm & to the rib cage?

	Diaphragm	Ribcage
(a)	Becomes flatten	Moves downwards & inwards
(b)	Becomes flatten	Moves outwards & upwards
(c)	Becomes more curved	Moves downwards & inwards
(d)	Becomes more curved	Moves outwards & upwards

94. The term gene was coined by
(a) Johannsen (b) Charles Darwin (c) Gregor Mendel d) Linnaeus

95. National Centre for Biological Sciences located at
(a) Bangalore (b) Mysore (c) Chennai (d) Cuttack

96. During development of a frog, tadpole changes into an adult. This process is called
(a) ecdysis (b) metamorphosis (c) peristalsis (d) cyclosis

97. An immediate higher group of related species of plants or animals is called

(a) genus (b) order c) population d) class

98. Father of white revolution in india is

(a) Verghese Kurein (b) M.S Swaminathan (c) J.C bose (d) H.G Khorana

99. Match the vitamins and nutrients with the deficiency diseases given below & select the correct option.

(a)	Vitamin A	p	BeriBeri
(b)	Vitamin B	q	Xerophthalmia
(c)	Iodine	r	Kwashiorkor
(d)	Proteins	s	Goitre

(a) A = q , B = p , C = s , D = r b) A = s , B = r , C = q , D = p

(c) A = r , B = s , C = q , D = p d) A = p , B = s , C = q , D = r

100. Sex is determined by different factors in various species. In human beings the sex of the girl child depends on whether

(a) paternal chromosome is X (b) maternal Chromosomes is Y

(c) paternal chromosome is Y (d) paternal Chromosomes both X & Y

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Space for Rough Work

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