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

LEAD TALENT SEARCH EXAM - LTSE 2020

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 2022 / Karnataka CET 2022 / Kerala KEAM 2022 / NEET-UG entrance exams.

NAME OF THE STUDENT :……

NAME OF THE TEST CENTER :……

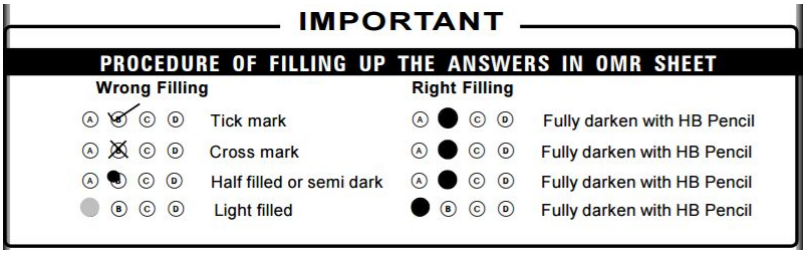
REGISTRATION NUMBER (7-digit code number in OMR) ……..……

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

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

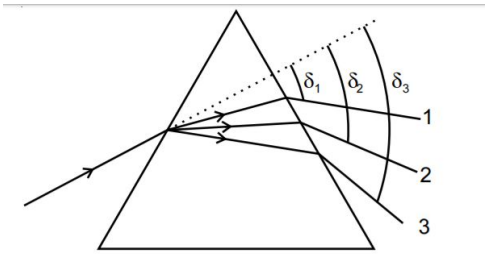
INSTRUCTIONS TO THE CANDIDATE:

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. A ray of white light incident on a glass prism gets separated into its various components of colours. If δ_1, δ_2 and δ_3 are deviations of colour of light 1, 2 and 3 respectively with respect to the original incident ray, then rays 1, 2 and 3 can respectively be



(a) Blue, green and yellow
(b) Orange, yellow and red
(c) Red, orange and yellow
(d) Indigo, blue and green

2. Locate the position of the image formed by a concave mirror for an object placed between its principal focus and centre of curvature.
(a) At centre of curvature
(b) Between infinity and centre of curvature
(c) Between pole and focus
(d) Behind the mirror

3. For a plane mirror, magnification is always
(a) = 0 (b) = 1 (c) < 1 (d) > 1

4. A body starts from rest with a uniform acceleration of 1 m/s^2. The average velocity in the interval of t = 3 s to t = 5 s is
(a) 4 m/s (b) 1 m/s (c) 0.4 m/s (d) 4 cm/s

5. Which of the following is not a unit of power?
(a) VA (b) Js^{-1} (c) kW (d) Wh

6. The value of acceleration due to gravity
(a) is least on equator
(b) is least on poles
(c) is same on equator and poles
(d) increases from pole to equator

7. The boiling point of alcohol is 78°C. What is this temperature in Kelvin scale:
(a) 373 K (b) 351 K (c) 375 K (d) 78 K

8. Power of the lens is $-40m^{-1}$, its focal length is
(a) 4m (b) -40m (c) -0.25m (d) -0.025m

9. If two balls of same masses are dropped on sand, the depths of penetration is same if
(a) Heavier ball is dropped faster than lighter ball
(b) Lighter ball is dropped faster than heavier ball
(c) The product 'mv' is same for both bodies
(d) None of these

10. If the velocity of a body is doubled its kinetic energy
(a) gets doubled (b) becomes half
(c) does not change (d) becomes 4 times

11. A students carries a bag weighing 5 kg from the ground floor to his class on the first floor that is 2 m high. The work done by the boy is
(a) 1 J (b) 10 J (c) 100 J (d) 1000 J

12. The spring will have maximum potential energy when
(a) it is pulled out (b) it is compressed
(c) both (a) and (b) (d) neither (a) nor (b)

13. The gravitational potential energy of an object is due to
(a) its mass (b) its acceleration due to gravity
(c) its height above the earth's surface (d) all of the above

14. If a planet moves around the star in circular orbit then which quantity does not change with time?
(a) Speed (b) Momentum (c) Velocity (d) None of these

15. A body is moving with an initial velocity of 5 m/sec accelerates at 1 m/s2. Its velocity after 5 sec will be
(a) 20 m/s (b) 10 m/s (c) 5 m/s (d) zero

16. The ratio of magnitudes of average speed to average velocity is :–
(a) always less than one (b) always equal to one
(c) always more than one (d) equal to or more than one

17. A body starts from rest with a uniform acceleration of 4 m/s and is moving in a horizontal direction. Distance travelled by it in 5 sec is :–
(a) 50 m (b) 20 m (c) 8 m (d) 10 m

18. A bus moving along straight line increases its speed from 36 km/h to 72 km/h in 5 sec, acceleration of the bus is :–
(a) 7.2 m/s (b) 1 m/s (c) 2 m/s (d) 4 m/s

19. A hammer of mass 500 g, moving at 20 m/s, strikes a nail. The nail stops the hammer in a very short time of 0.01 sec. What is the magnitude of the force due to nail on the hammer?
(a) 10,000 N (b) 1000 N (c) 100 N (d) 1 N

20. Which of the following is true for spherical mirrors (where f is the focal length and R is Radius of Curvature)
(a) f = 2R (b) R = 2f (c) fR = 2 (d) fR = 1/2

Section II: Chemistry

21. An element with atomic no. 15 shows similar chemical properties with
(At. no. Be = 4, Ne = 10, N = 7, O = 8)
(a) Be (b) Ne (c) N (d) O

22. The molecular mass of X is 106. X can be
(Ca=40, S=32, O=16, Na=23, Cl=35.5, C=12)
(a) $CaCO_3$ (b) SO_3 (c) NaCl (d) Na_2CO_3

23. Under which of the following conditions we can boil water at room temperature?
(a) At low temperature (b) At very high pressure
(c) At high pressure (d) At atmospheric pressure

24. The gas usually filled in an electric bulb is _____
(a) N_2 (b) H_2 (c) O_2 (d) NH_3

25. The catalyst used in the hydrogenation of oils is _____
(a) Zinc (b) Nickel (c) Platinum (d) Iron

26. Which of the following is formed by the loss of an electron from an atom?
(a) Ion with 1 unit of negative charge
(b) Ion with 1 unit of positive charge
(c) Isotope
(d) Isobar

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

28. An element X on exposure to moist air gradually develops reddish brown coating and a new compound Y is formed on the surface. The substances X and Y are
(a) Fe and FeO (b) Cu and CuO (c) Fe and Fe_2O_3 (d) Ag and Ag_2S

29. Which of the following statements is incorrect?
(a) Graphite is a good conductor of electricity
(b) In a crystal of graphite, each carbon atom is linked to four other carbon atoms.
(c) C-60 is an allotropic form of carbon
(d) Diamond is used for cutting glasses

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

31. The metal which does not displace hydrogen from dilute acids is
(a) Fe (b) Zn (c) Ag (d) Na

32. Which of the following is used to remove temporary hardness of water?
(a) Washing soda (b) Boiling
(c) Baking soda (d) Caustic Soda

33. Which of the following is not an oxidizing agent?
(a) Oxygen (b) Hydrogen (c) $KMnO_4$ (d) chlorine

34. Which of the following has odour?
(a) Carbon dioxide (b) Chlorine (c) Nitrogen (d) Oxygen

35. Which of the following is an odd pair?
(a) C_3H_6 , C_4H_8 (b) C_5H_{12} , C_6H_{14} (c) C_4H_6 , C_5H_8 (d) C_5H_{12} , C_5H_{10}

36. Which of the following is not an inert gas?
(a) Br (b) Ar (c) He (d) Ne

37. Number of electrons present in each atom of phosphorus is 15. Valence electrons shall be
(a) 2 (b) 8 (c) 5 (d) 4

38. Which among the following pairs will have the same mass? (S=32, N=14 and O=16)
(a) 0.2 mole of SO_2 and 0.2 mole of N_2O
(b) 0.2 mole of SO_2 and 0.2 mole of CO_{12}
(c) 0.2 mole of CO_2 and 0.2 mole of N_2O
(d) 0.2 mole of N_2O and Avogadro number of CO molecules.

39. A cook adds 34.2g of sugar($C_{12}H_{22}O_{11}$) to prepare tea. The number of Carbon atoms added will be (C=12, H=1, O=16)
(a) 1.8×10^{22} (b) 3.6×10^{22} (c) 7.2×10^{23} (d) 0.025

40. A piece of writing with a graphite pencil weighs 12 mg. What will be the number of carbon atoms present in the signature? (C=12)
(a) 0.02×10^{21} (b) 0.502×10^{21} (c) 5.02×10^{24} (d) 6.02×10^{20}

Section III: Logical Reasoning

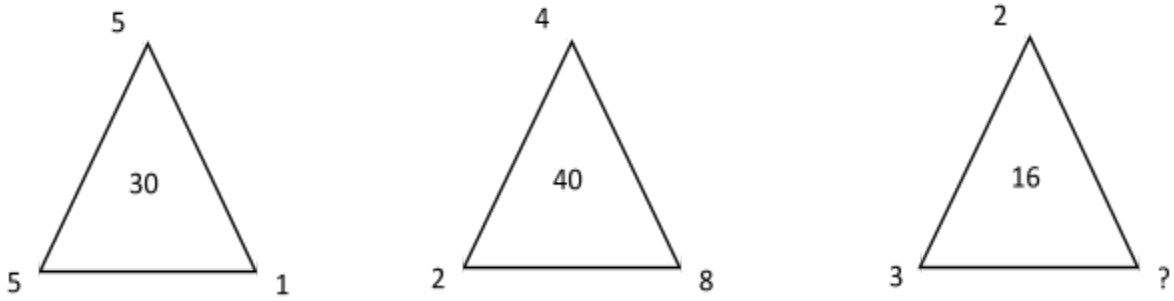
41. Observe the series and fill the blank with correct number:

35,14, 64, 40, ___, 67.
(a) 33 (b) 83 (c) 93 (d) 99

42. The sum of the ages of five children born at intervals of three years each is 60 years. What is the age of the eldest child?

(a) 6 (b) 12 (c) 18 (d) 15

43. Which number replaces question mark?



(a) 2 (b) 8 (c) 5 (d) 10

44. Find the next number in the series.

423, 534, 479, 590, 535, ___.
(a) 435 (b) 546 (c) 646 (d) 575

45. Nida has a brother Saad. Saad is the son of Majida. Rukhsana is Majida's mother. How is Rukhsana related to Nida?

(a) Mother (b) Sister (c) Grand daughter (d) Grandmother

46. In a cricket match Chand scored less than Chan but more than Chen. Cheng scored less than Chand but more than Chen. Whose score was the lowest in the match?

(a) Chan (b) Chand (c) Chan (d) Chen

47. Abdullah is faster than Shakeeb but not as fast as Tariq. Salahuddin is faster than Shakeeb. Tariq is not as fast as Salahuddin. who among them is the fastest?

(a) Shakeeb (b) Abdullah (c) Tariq (d) Salahuddin

48. A boy started from his home to the supermarket which is 15 km North. After walking 5 km towards east, he turned to his left and walked 8km. Then he again turned to his left and walked for 5 km. In which direction is he from his house?

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

49. A 4-digit number 14a5 is added to a 3-digit number 987 to give a 4-digit number 24b2, which is divisible by 11. Find a and b?

(a) a=2, b=0 (b) a=5, b=4 (c) a=2, b=3 (d) a=1, b=8

50. If 2xy1 is a four digit number divisible by 77 then (x-y) is equal to:

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

51. A person cycles 3 km every day except on Sundays on which he cycles 4 km. How many kilometres he would cycle by 5th December (including), if he started on 28th October which was a Monday?

(a) 135 (b) 122 (c) 120 (d) 124

52. The acute angle between the minute hand and the hour hand of a clock, when the time is 8.40 PM, is:

(a) 0° (b) 6° (c) 20° (d) 18°

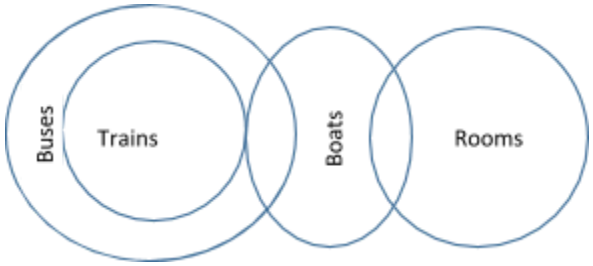
53. Which number replaces the question mark?

2, 7, 6, 24, ?, 75, 30
(a) 12 (b) 14 (c) 20 (d) 8

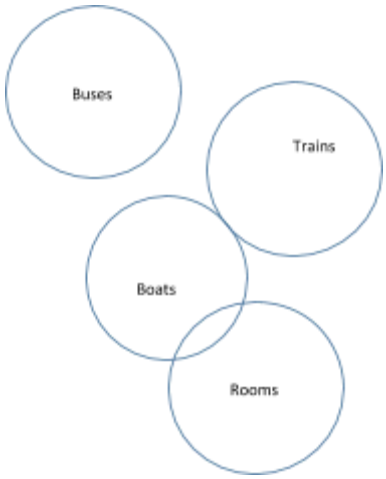
54. Analyze following diagrams and find out the diagram which accurately represents the given statement.

STATEMENT: Some boats are rooms, all trains are buses, some buses are boats and no rooms are buses

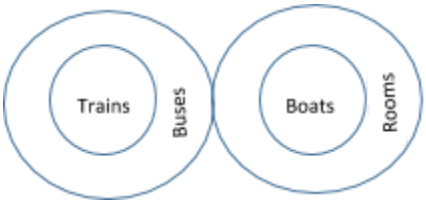
(a)



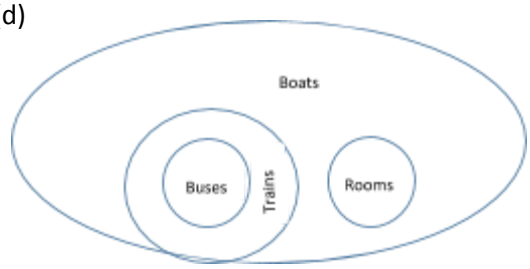
(b)



(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:

SING : rezt

PING : zrme

SIT : etp

TIE : qpe

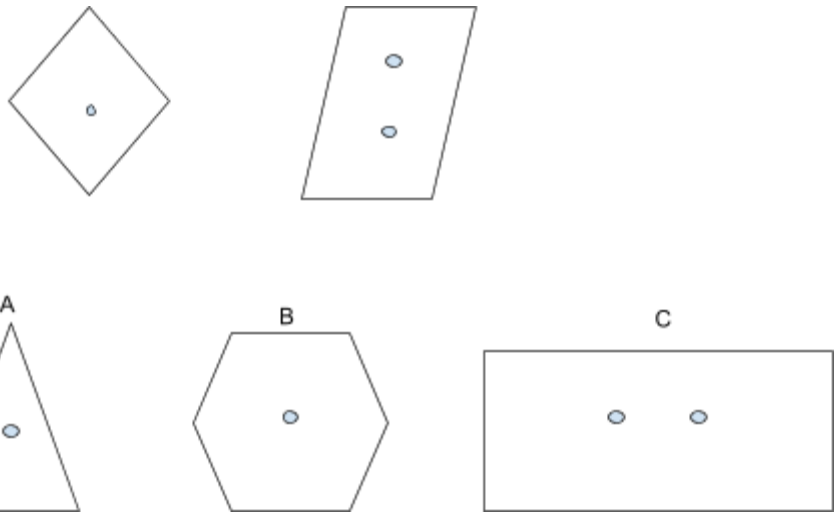
55. Which is the code for letter S?

(a) t (b) z (c) r (d) e

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

(a) timp (b) temp (c) pezt (d) tmep

57. Identify a quality that the two shapes have in common. Select which of the 3 marked shapes below have similar quality.



(a) A (b) B (c) C (d) None

58. Study the following arrangement carefully and answer the question

H B 8 $ W E 7 * 5 C © Z 2 Q A @ 6 T # 3 J 1 F K 9 I % D 4 P

Which of the following is the 25th element backwards from the end of the arrangement

(a) Z (b)A (c) $ (d) E

59. Directions - Based on the first two statements, the third statement could be true, false, uncertain or unrelated. Choose the correct judgement:

All trees in the park are flowering trees

Some of the trees in the park are dogwoods

All dogwoods in the park are flowering trees

(a) True (b) False (c) Uncertain (d) Unrelated

60. I. The prices of petrol and diesel in the domestic market have remained unchanged for the past few months

II. The crude oil prices in the International market have gone up substantially in the last few months.

(a) Statement I is the cause and statement II is its effect
(b) Statement II is the cause and statement I is its effect
(c) Both the statements I and II are independent causes
(d) Both the statements I and II are effects of independent causes.

Section IV: Mathematics

61. If $a : b : c = 3 : 4 : 7$, then the ratio $(a + b + c) : c$ is equal to
(a) $2 : 1$ (b) $14 : 3$ (c) $7 : 2$ (d) $1 : 2$

62. 6 pipes are required to fill a tank in 1 hour 30 minutes. How long will it take if only 5 pipes of the same type are used?
(a) 75 minutes (b) 1 hour 48 minutes
(c) 1 hour (d) 2 hours

63. $\left\{\left(\frac{1}{3}\right)^{-1} - \left(\frac{1}{4}\right)^{-1}\right\}^{-1} =$
(a) 1 (b) 0 (c) -1 (d) 2

64. 1.14 expressed as a percentage of 1.9 is
(a) 6% (b) 10% (c) 60% (d) 90%

65. On Sunday 845 people went to the zoo. On Monday only 169 people went. What is the percent decrease in the people visiting the zoo on Monday?
(a) 10% (b) 50% (c) 80% (d) 75%

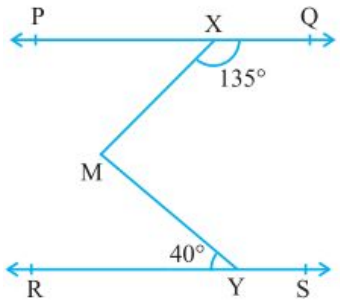
66. Which of the following is a perfect square?
(a) 3422238 (b) 45331232 (c) 88823123 (d) 89397025

67. Probability of getting an even number in a single throw of dice is
(a) $\frac{1}{2}$ (b) $\frac{1}{6}$ (c) $\frac{5}{6}$ (d) None of these

68. Find the mode of the data 14, 25, 14, 28, 18, 17, 18, 14, 23, 22, 14, 18.
(a) 14 (b) 18 (c) 28 (d) 17

69. In the given figure, if $PQ \parallel RS$, $\angle MXQ = 135^\circ$ and $\angle MYR = 40^\circ$, then $\angle XMY =$

(a) 60°
(b) 85°
(c) 45°
(d) 90°



70. Two right circular cones of equal curved surface areas have slant heights in the ratio of $3 : 5$. Find the ratio of their radii.
(a) $4 : 1$ (b) $3 : 5$ (c) $5 : 3$ (d) $4 : 5$

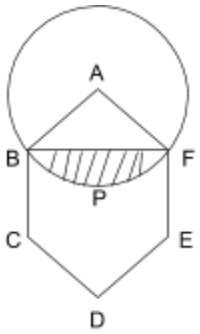
71. If $x + y = 3$ and $x^2 + y^2 = 5$, then $xy =$
(a) 1 (b) 3 (c) 2 (d) 5

72. Decimal representation of a rational number cannot be

(a) terminating (b) non-terminating

(c) non-terminating repeating (d) non-terminating non-repeating

73. In the given figure, the centre of the circle is A and ABCDEF is a regular hexagon of side 6 cm. The approximate area of segment BPF is (Take $\pi = 3.14$)



(a) 25 cm^2 (b) 22 cm^2

(c) 32 cm^2 (d) 30 cm^2

74. If the sum of n terms of an A.P. is $nA + n^2B$, where A and B are constants, then its common difference will be

(a) $A - B$ (b) $A + B$ (c) $2A$ (d) $2B$

75. If $\alpha \neq \beta$, but $\alpha^2 = 5\alpha - 3$ and $\beta^2 = 5\beta - 3$, then the equation having $\frac{\alpha}{\beta}$ and $\frac{\beta}{\alpha}$ as roots is

(a) $3x^2 - 19x + 3 = 0$ (b) $3x^2 + 19x - 3 = 0$

(c) $3x^2 - 19x - 3 = 0$ (d) $x^2 - 5x + 3 = 0$

76. The vertices of the triangle formed by the following equations are

$3x - y = 3$
$2x - 3y = 2$
$x + 2y = 8$

(a) $(1,0)$, $(2,3)$, $(4,2)$ (b) $(1,1)$, $(2,3)$, $(2,4)$

(c) $(1,0)$, $(3,2)$, $(4,2)$ (d) $(1,2)$, $(2,3)$, $(4,2)$

77. If the zeros of the polynomial $x^3 - 12x^2 + 39x + k$ are in A.P., then the value of k is

(a) 20 (b) 28 (c) 128 (d) -28

78. A line from vertex A of an equilateral triangle ΔABC meets the opposite side BC in P and the circumcircle of ΔABC in Q. If BQ = 4 cm and CQ = 3 cm, then PQ is equal to

(a) 7 cm (b) $\frac{4}{3}$ cm (c) $\frac{12}{7}$ cm (d) 2 cm

79. The bisectors of $\angle$B and $\angle$C of a triangle ABC meet at point O. If $\angle$A = 70° then $\angle$BOC is equal to

(a) 90° (b) 110° (c) 140° (d) 125°

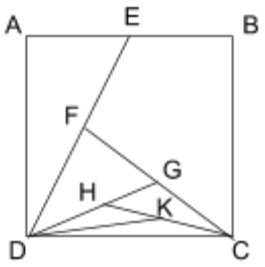
80. In the figure, the area of square ABCD is 4 cm^2 and E is the midpoint of AB. F, G, H and K are midpoints of DE, CF, DG and CH respectively. The area of Δ KDC is

(a) $\frac{1}{4}$ cm^2

(b) $\frac{1}{8}$ cm^2

(c) $\frac{1}{16}$ cm^2

(d) $\frac{1}{32}$ cm^2



Section V: Biology

81. What is the result of a diet lacking iron?

(a) Bleeding gums (b) Poor wound healing

(c) Reduced number of red blood cells (d) Weak bones and teeth

82. As we breathe out __1__ is __2__ through the lungs.

	1	2
(a)	CO_2	excreted
(b)	CO_2	respired
(c)	O_2	excreted
(d)	O_2	respired

83. What is the response to a low concentration of glucose in blood?

(a) Glucagon will cause the body to convert glucose to glycogen

(b) Glucagon will cause the body to convert glycogen to glucose

(c) Insulin will cause the body to convert glucose to glycogen

(d) Insulin will cause the body to convert glycogen to glucose

84. What is common to both plant and animal cells?

(a) Cell wall (b) Chloroplast

(c) Vacuole which is large (d) Cell membrane

85. What is the correct order of increasing size of following structures smallest to largest?

(a) Chromosome → Liver → White Blood Cell

(b) Chromosome → White Blood Cell → Liver

(c) Liver → Chromosome → White Blood Cell

(d) White Blood Cell → Liver → Chromosome

86. What statement describes how young plants are supported?

(a) The pressure inside the cells pressing outwards on the cell membrane

(b) The pressure of water inside the cell pressing outwards on the cell membrane

(c) The pressure of water passing from the roots through the phloem

(d) The pressure of water passing from the roots through xylem

87. Small molecules are used as the basic units in the synthesis of large food molecules. Which of the following statements is correct?

(a) Amino acids are the basic units of carbohydrates

(b) Fatty acids are the basic units of glycogen

(c) Glycerol is basic unit of oils

(d) Simple sugar is basic unit of protein.

88. In which region of the alimentary tract is maltose digested?
(a) Colon (b) Small intestine (c) Rectum (d) Liver

89. Which process occurs during transpiration?
(a) Evaporation of water from xylem
(b) Loss of water by osmosis from guard cells
(c) Movement of water through spongy mesophyll cells by active transport
(d) Movement of water through stomata by diffusion.

90. Which chamber of heart has most muscular wall?
(a) Aorta (b) Left atrium
(c) Left ventricle (d) More than one option is correct

91. What is the function of white blood cells?
(a) To carry oxygen (b) To carry glucose
(c) To produce antibodies (d) To produce antibiotics

92. A deficiency of which of the following may result in failure of blood clotting?
(a) Antibodies (b) Fibrinogen (c) Haemoglobin (d) Protease

93. What is the function of xylem?
(a) Transporting dissolved nutrients and mineral ions
(b) Transporting dissolved nutrients only
(c) Transporting water and mineral ions only
(d) Transport water only

94. What characteristics do all living organisms show?
(a) Breathing oxygen (b) Excretion
(c) Photosynthesis (d) Tropism

95. In which part of the cell aerobic respiration occurs?
(a) Cytoplasm (b) Mitochondria (c) Ribosomes (d) Vesicles

96. What dietary deficiency causes constipation?
(a) Roughage (b) Fat (c) Carbohydrate (d) glycerol

97. What will not affect transpiration?
(a) Humidity of atmosphere (b) Number of open stomata
(c) Rate of respiration (d) Temperature

98. In which form nitrogen is taken up by the roots of plants?
(a) As amino acids (b) As nitrate ions
(c) As proteins (d) As N-Acetyl Muramic Acid

99. How does eutrophication lead to death of aquatic organisms?
(a) Algae are not releasing enough oxygen
(b) Algae respiring instead of photosynthesising
(c) Decomposer bacteria lowering oxygen concentration in water
(d) Poisoning due to CO_2 accumulation in water

100. Which part of a plant root hair is partially permeable?

(a) Cell sap (b) Cell surface membrane

(c) Cell vacuole (d) H. Pylori

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Space for Rough Work

Space for Rough Work