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 :……

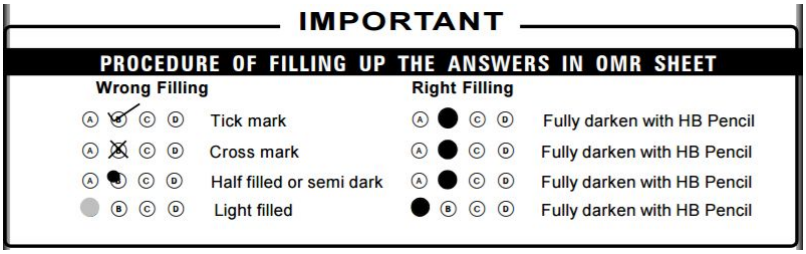
REGISTRATION NUMBER (7-digit code number in OMR) ……..……

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

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

INSTRUCTIONS TO THE CANDIDATE:

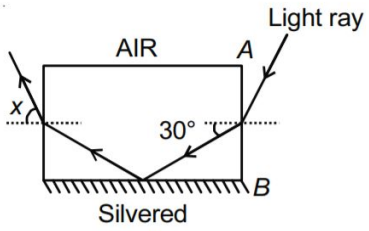
1. **This question paper consists of 5 sections out of which only 4 need to be attempted. Sections I, II and III are compulsory. From Sections IV and V, Students opting for Engineering need to attempt Section IV (Maths) and Students opting for Medical need to attempt Section V (Biology).**
   - Section 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. Read the given statements and select the correct option.
Statement 1 : A concave mirror and a convex lens both have the same focal length in air. When they are submerged in water, they will still have the same focal length.
Statement 2 : The refractive index of water is greater than the refractive index of air
(a) Both statements 1 and 2 are true and statement 2 is the correct explanation of statement 1.
(b) Both statements 1 and 2 are true but statement 2 is not the correct explanation of statement 1.
(c) Statement 1 is true but statement 2 is false.
(d) Statement 1 is false but statement 2 is true.

2. A rectangular glass slab having refractive index $\sqrt{3}$, is silvered at one surface as shown in the figure. If the angle of refraction of the light ray at the interface AB is 30°, then the measure of angle x will be



(a) 45° (b) 30° (c) 60° (d) 90°

3. A stone is thrown vertically upward with a speed of 40 m/s. The time interval for which particle was above 40 m from the ground is (g = 10 m/s^2)
(a) $4\sqrt{2}$ s (b) 8 s (c) 4 s (d) $2\sqrt{2}$ s

4. Which of the following is true for the values of G and g on the surface of the moon and earth? (G is Universal Gravitational Constant and g is Acceleration due to Gravity)
(a) G remains the same but g changes
(b) g remains the same but G changes
(c) Both G and g remain same
(d) Both G and g changes

5. A horizontal force of 4 N acts on a body of mass 40 kg to move it by a distance of 2 m on a table. The kinetic energy acquired by the body is :
(a) 16 J (b) 32×10^8 erg (c) 8 J (d) 32 erg

6. A closed compartment containing a gas is moving with some acceleration in horizontal direction. Neglect effect of gravity. Then the pressure in the compartment is
(a) Same everywhere (b) Lower in the front side
(c) Lower in the rear side (d) Higher in the upper side

7. A stone tied to a thread revolves in a vertical circle. The thread has maximum tension at
(a) The lowest point (b) Highest point
(c) Midway between highest and lowest points (d) None of the above

8. Attraction of small bits of paper by a comb drawn through dry hair is due to
(a) Electrostatic force (b) Electromagnetic force
(c) Frictional force (d) Gravitational force

9. Boiling point of water in Fahrenheit scale is
(a) 180 deg F (b) 158 deg F (c) 100 deg F (d) 212 deg F

10. A boy runs on a circular track of radius 20 m and stops after covering one sixth of the track. The magnitude of his displacement will be
(a) 20π m (b) 20 m (c) 40π m (d) $20\pi/3$ m

11. A pistol of mass 2 kg fires a bullet of mass 50 g. The bullet strikes a stationary block of mass 0.5kg. If the block, with the bullet embedded in it, moves with a velocity of 4 m/s, the recoil velocity of the pistol will be (Ignore friction and air resistance)
(a) –1.10 m/s (b) –0.5 m/s (c) –0.55 m/s (d) –1 m/s

12. A girl of mass 40 kg takes a staircase of 15 steps, each of height 20 cm. If she utilizes a power of 80 W to climb the staircase, the time taken by her is [Take g = 10 m/s^2]
(a) Half a minute (b) 40 s (c) 45 s (d) 15 s

13. If ratios of masses and velocities of two bodies are 2 : 3 and 4 : 5 respectively, then the ratio of magnitude of their momenta is
(a) 15 : 8 (b) 8 : 15 (c) 5 : 6 (d) 6 : 5

14. Choose the pair of quantities having same unit.
(a) Power and energy (b) Current and potential difference
(c) Work and energy (d) Magnification and power

15. When a ball is thrown vertically upwards, then at the highest point
(a) Acceleration is zero but velocity is non-zero
(b) Acceleration is non-zero but velocity is zero
(c) Both acceleration and velocity are zero
(d) Both acceleration and velocity are non-zero

16. A passenger, sitting inside a train, is facing in the direction of motion of the train. He tosses a coin vertically upwards that falls ahead of him. It means that the train is
(a) In uniform motion (b) Slowing down
(c) Speeding up (d) Taking a turn

17. A metal sphere of mass 12 kg has the same diameter as another sphere of mass 4 kg. Both spheres are dropped simultaneously from a tower. When they are 8 m above the ground, they have the same ____. (Neglect air resistance.)
(a) Kinetic energy (b) Potential energy
(c) Momentum (d) Acceleration

18. According to the third law of motion, action and reaction
(a) Always act on the same body
(b) Always act on different bodies in opposite directions
(c) Have same magnitude and direction
(d) Act on either body at normal to each other

19. The boiling point of water in Celsius and Kelvin scale respectively is:
(a) 373, 273 (b) 0, 273 (c) 273, 373 (d) 100, 373

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

Section II: Chemistry

21. The number of molecules in 22 g of CO_2 will be
(a) 6.02×10^{22} (b) 3.01×10^{23} (c) 6.02×10^{23} (d) 3.01×10^{22}

22. The number of moles of chlorine that can form 6.02×10^{25} molecules of hydrogen chloride is (H=1, Cl=35.5)
(a) 10 (b) 100 (c) 50 (d) 5

23. Which one of the following does not contain iron?
(a) Haematite (b) Magnetite (c) Copper pyrites (d) Bauxite

24. Which one of the following metals will have the configuration ns^2 in the valence shell?
(a) Copper (b) Chromium (c) Calcium (d) Sodium

25. The chemical formula of caustic soda is
(a) KOH (b) $Ca(OH)_2$ (c) NaOH (d) NH_4OH

26. The substance not responsible for hardness of water is
(a) Magnesium bicarbonate (b) Sodium nitrate
(c) Calcium hydrogen carbonate (d) Calcium chloride

27. The electrolytic decomposition of water gives hydrogen and oxygen in the ratio of
(a) 2:1 by volume (b) 1:2 by volume (c) 1:2 by mass (d) 8:1 by mass

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

29. The pH of three solutions A, B and C are 2, 5 and 7 respectively. Choose the correct statement.
(a) B is more acidic than A (b) C is more acidic than A and B
(c) C is basic (d) none of these

30. Which among the following is used to produce artificial rain?
(a) Copper oxide (b) Dry ice (c) Silver iodide (d) Silver nitrate

31. Which of the following metals is generally used for making filament of electric bulbs?
(a) Fe (b) Au (c) W (d) Cu

32. Which element is mainly used to make glass?
(a) Na (b) Pb (c) K (d) Si

33. Which fiber is also called artificial silk?
(a) Nylon (b) Acrylic (c) Rayon (d) Polyester

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

35. When a piece of sodium is put into water _____
(a) hydrogen is liberated (b) water becomes acidic
(c) oxygen is liberated (d) There is no reaction

36. Which of the statements about the following reaction is correct?
$Fe_2O_3 + 3CO \longrightarrow 2Fe + 3CO_2$
(a) Fe_2O_3 is reduced (b) CO is reduced
(c) CO_2 is oxidized (d) Fe_2O_3 is oxidized

37. Which of the following has maximum number of atoms?
(a) 18 g of water (b) 18 g of oxygen
(c) 18 g of Carbon dioxide (d) 18 g of methane

38. The liquid metal is
(a) Au (b) Mg (c) Hg (d) Ag

39. Which of the following species contains 9 protons, and 10 electrons
(Atomic number F = 9, Na = 11)
(a) F (b) F^- (c) Na (d) Na^+

40. Which of the following does not sublime?
(a) Naphthalene (b) Camphor
(c) Sodium chloride (d) Iodine

Section III: Logical Reasoning

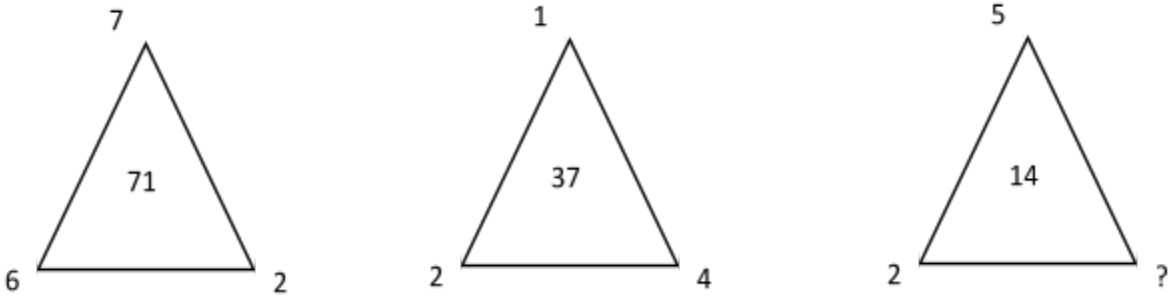
41. Observe the series and fill the blank with correct number:

570, 285, 150,75, ___, 39.
(a) 85 (b) 78 (c) 53 (d) 29

42. The sum of the ages of seven children born at intervals of three years each is 140 years. What is the age of the middle child?

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

43. Which number replaces question mark?



(a) 1 (b) 8 (c) 4 (d) 10

44. Find the next number in the series.

220, 81, 110 , 27, 55, ___.
(a) 8 (b) 9 (c) 10 (d) 35

45. Rafeeq has a brother Shafin. Rafeeq is the son of Muhammad. Kaleem is Muhammad's father. How is Shafin related to Kaleem?

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

46. In a cricket match Sachin scored more than Hisham but less than Justin. Roshan scored less than Sachin but more than Hisham. Whose score was the lowest in the match?

(a) Hisham (b) Roshan (c) Justin (d) Sachin

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

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

48. A girl started from her school. After walking 4 km towards west, she turned to her right and walked for 8km. Then she again turned to her right and walked for 10 km. In which direction is she from her house?

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

49. A 3-digit number 2a5 is added to another 3-digit number 984 to give a 4-digit number 1b99, which is divisible by 11. Find a and b?

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

50. If 7xy5 is a four digit number divisible by 55 and x > 0, 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 Tuesday?

(a) 131 (b) 141 (c) 130 (d) 120

52. The acute angle between the minute hand and the hour hand of a clock, when the time is 6.30 AM, is:

(a) 0° (b) 15° (c) 12° (d) 20°

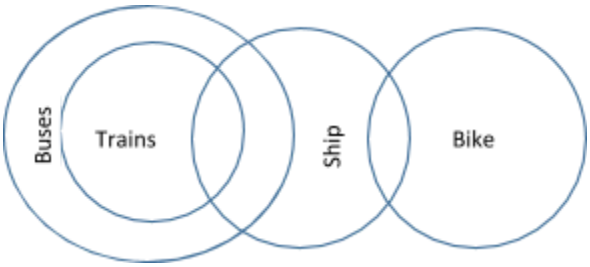
53. Which number replaces the question mark?

2, 6, 12, 20, 30, ?, 56
(a) 35 (b) 40 (c) 41 (d) 42

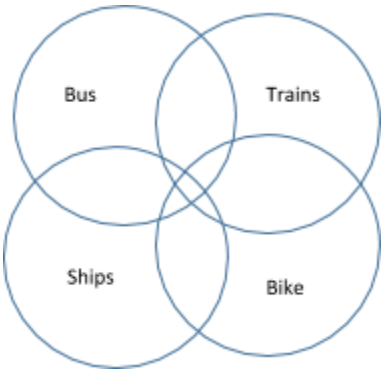
54. Analyze following diagrams and find out the diagram which accurately represents the given statement.

STATEMENT: No ship is trains but some ship are bikes, No bike is bus and all busses are trains

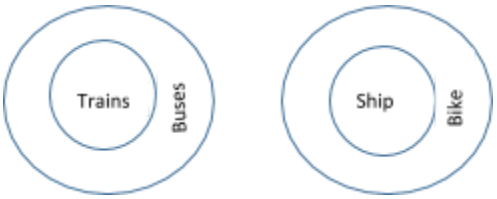
(a)



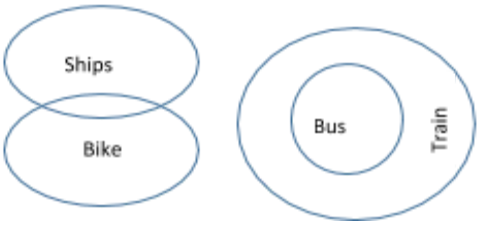
(b)



(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 : bdme

PING : dmob

SIN : emb

SIR : gem

55. Which is the code for letter S?

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

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

(a) emg (b) obe (c) mbo (d) omb

DIRECTIONS FOR QUESTIONS 57-60: Study the following information carefully and answer the questions given below it. Sam, Raheem, Ivan, Hamza and Roshan 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 Sam and Roshan do not take peda.

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

(a) Sam and Ivan (b) Hamza and Roshan (c) Roshan and Ivan (d) Sam and Roshan

58. Who took three sweets?

(a) Ivan (b) Raheem (c) Roshan (d) Sam

59. Who only had peda and gulab Jamun?

(a) Sam (b) Raheem (c) Roshan (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. If 15 workers can build a wall in 48 hours, how many workers will be required to do the same work in 30 hours?
(a) 10 (b) 24 (c) 12 (d) 20

62. If A and B are in the ratio $3:4$, and B and C are in the ratio $12:13$, then A and C will be in the ratio
(a) $3:13$ (b) $9:13$ (c) $36:13$ (d) $13:9$

63. $\dfrac{3^{-5}\times 10^{-5}\times 125}{5^{-7}\times 6^{-5}} =$
(a) 3125 (b) 625 (c) 6125 (d) 125

64. One and a half percent, written as a decimal, is
(a) 0.015 (b) 0.005 (c) 1.5 (d) 1.50

65. The population of a place is increasing at a rate of 5% per annum. If the population is 44,100 in 2003, then the population in 2001 was
(a) 42,000 (b) 40,000 (c) 35,000 (d) 30,000

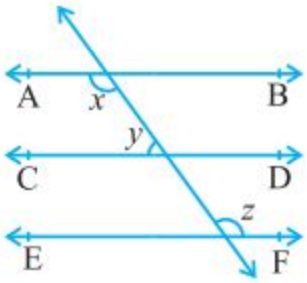
66. Which of the following is a perfect cube?
(a) 91125000 (b) 45324500 (c) 98839440 (d) 211020000

67. There are 5 red and 3 black balls in a bag. Probability of drawing a black ball is
(a) $\frac{5}{8}$ (b) $\frac{1}{2}$ (c) $\frac{3}{8}$ (d) None of these

68. What is the median of the data 78, 56, 22, 34, 45, 54, 39, 68, 54, 84?
(a) 54 (b) 53 (c) 55 (d) 51

69. In the given figure, if $AB \parallel CD$, $CD \parallel EF$ and $y:z = 3:7$, then $x =$

(a) 18°
(b) 54°
(c) 126°
(d) 72°



70. The pillars of a building are cylindrically shaped. If each pillar has a circular base of radius 20 cm and height 10 m, concrete required to build 14 such pillars is
(a) $8.8\ m^3$ (b) $1.256\ m^3$ (c) $17.6\ m^3$ (d) $12.56\ m^3$

71. If $(x-1)$ is a factor of $4x^{3000} + 3x^{2000} - 4x^{1000} + k$, then the value of k is
(a) 1 (b) 2 (c) 3 (d) -3

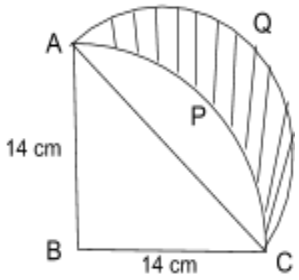
72. $\frac{3\sqrt{12}}{6\sqrt{27}}$ equals

(a) $\frac{1}{2}$ (b) $\frac{1}{3}$ (c) $\sqrt{3}$ (d) $\sqrt{2}$

73. In the adjoining figure ABCPA is a quadrant of a circle of radius 14 cm. With AC as a diameter, a semicircle is drawn. The area of the shaded region is

(a) 35 cm^2 (b) 64 cm^2

(c) 98 cm^2 (d) 132 cm^2



74. If a, b, c are in A.P., then $\frac{(a-c)^2}{b^2-ac} =$

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

75. The solution set of the equation $pqx^2 - (p+q)^2 x + (p+q)^2 = 0$ is

(a) $\frac{p}{q}, \frac{q}{p}$ (b) $pq, \frac{p}{q}$ (c) $\frac{p+q}{q}, \frac{p+q}{p}$ (d) $\frac{p-q}{q}, \frac{p-q}{p}$

76. Imagine a triangle A formed by the lines representing the following equations with the x-axis. Consider another triangle B formed by the lines representing the following equations with the y-axis. The ratio of the area of the triangle A and the area of the triangle B is

$2x + y = 6$

$2x - y + 2 = 0$

(a) $1:4$ (b) $4:1$ (c) $1:8$ (d) $1:1$

77. If p, q and r are zeros of the polynomial $6x^3 + 3x^2 - 5x + 1$, then the value of $\frac{1}{p} + \frac{1}{q} + \frac{1}{r}$

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

78. ΔABC is an isosceles triangle in which AB = AC. If the side BA is produced to D such that AD = AB, then $\angle$BCD is

(a) 30° (b) 60° (c) 45° (d) 90°

79. Let l be the length of each equal side of an isosceles triangle. If the length of each equal side is doubled, keeping its height unchanged, then the difference of the squares of bases of the new triangle and the given triangle is

(a) 0 (b) $4l^2$ (c) $9l^2$ (d) $12l^2$

80. In a circle of 10 cm radius, two chords AB = AC = 12 cm. Then the length of the chord BC is

(a) 12 cm (b) 9.6 cm (c) 19.2 cm (d) 7.2 cm

Section V: Biology

81. Which of these is not a part of the male reproductive system?

(a) Vas Deferens (b) Leydig Cells

(c) Epididymis (d) Bartholin's Gland

82. Correct method of writing a generic name where genus is Leishmania and species is Donovani

(a) *Donovani* leishmania (b) *Leishmania Donovani*

(c) leishmania Donovani (d) *Leishmania donovani*

83. What is the central dogma of life?

(a) DNA undergoes replication. It undergoes transcription to form RNA and then translation to form proteins.

(b) DNA undergoes replication. Then undergoes translation to form mRNA and then transcription to form tRNA.

(c) RNA forms DNA which forms protein by transcriptional modification.

(d) All are correct and are seen in different types of cells.

84. Choose the option which is true.

(a) The functional unit of lung is hepatocyte

(b) The functional unit of a kidney is a neuron.

(c) The functional unit of a liver is nephron.

(d) Each kidney contains 1 million nephrons.

85. Maximum growth in root occurs

(a) at its tip (b) towards light

(c) behind the apex (d) towards apex

86. Fungal cell wall is made up of

(a) Peptidoglycan (b) Pectin

(c) N-Acetyl muramic acid and N-Acetyl glucosamine (d) Chitin

87. A Pteridophytic plant is

(a) horse-tail (b) bird wing

(c) flying fish (d) all of these

88. Which of the following statements is true?

(a) Pepsin digests proteins in small intestine

(b) Starch digestion begins in ileum and finishes completed in duodenum

(c) Protein digestion begins in the mouth and is completed by HCl in stomach

(d) Starch digestion begins in mouth

89. Pinus is included in which group?

(a) Gymnosperms (b) Pteridophyta (c) Bryophyta (d) None of these

90. Granulocytes and agranulocytes are found in _____.
(a) liver (b) lung (c) brain (d) blood

91. A eukaryotic cell does not have
(a) cell membrane (b) nuclear membrane (c) double standard DNA d) circular DNA

92. What are the functions of the Xylem vessels?
(a) Transportation of amino acids
(b) Transporting water along gravity
(c) Transporting electrolytes and minerals made in the leaf to the roots
(d) Water transport against gravity

93. Largest organ of the human body is
(a) liver (b) brain (c) skin (d) stomach

94. Which of the following statements are wrong regarding the blood circulation in humans?
(a) In humans, pulmonary circulation begins from the right side of the heart and ends in the left side.
(b) Pulmonary circulation occurs mainly through liver.
(c) Systemic circulation occurs through the entire body.
(d) In humans, the pulmonary circulation and systemic circulation together is known as the double circulation.

95. Where do you find maximum number of neurons?
(a) Spinal cord (b) Hands (palms) (c) Sole of feet (d) Grey matter of brain

96. The growth inhibiting and growth promoting (upward growth) hormones in plant are respectively
(a) Gibberellin and amylase (b) Amylase and auxins
(c) Abscisic acid and auxins (d) Carbonic acid and auxins

97. The common mode of reproduction in Hydra is
(a) Regeneration and budding (b) Fission and fragmentation
(c) Fusion and fission (d) Budding and fission

98. What is the use of dietary fibre in humans?
(a) Source of glucose and sugar (b) Adds bulk to stool
(c) It is a source of electrolytes and vitamins to humans (d) Both b and c are correct

99. Choose the correct pairs

1.	NAM, NAG	Peptidoglycon
2.	Glucose	Starch
3.	Amino acid	Proteins
4.	Poly-N-acetyl-glucosamine	Cell wall of fungi

(a) All of 1, 2, 3 and 4 are correct (b) Only 2 and 3 are correct
(c) 2, 3 and 4 are correct (d) Only 1 is correct

100. Peptic ulcer is caused by
(i) a virus
(ii) dietary factors
(iii) fungus
(iv) H. Pylori

(a) Options (i) and (iv) are **correct**
(b) Options (ii) and (iv) are **wrong**
(c) Options (ii) and (iv) are **correct**
(d) Options (i), (ii) are **correct** but (iii) and (iv) are **wrong**

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Space for Rough Work

Space for Rough Work

Space for Rough Work

Space for Rough Work