SCIENCE

1. The raisins in Beaker A swelled up because:
   a) Water moved into the raisins by osmosis
   b) Sugar entered the raisins by diffusion
   c) Cell wall absorbed water directly
   d) The temperature increased
2. The raisins in Beaker B shrank because:
   a) Water moved out of the raisins
   b) Sugar entered the raisins
   c) Osmosis did not occur
   d) The cell wall broke down
3. The experiment demonstrates that:
   a) Only solute can move across the membrane
   b) The plasma membrane is selectively permeable
   c) The cell wall allows all substances freely
   d) Osmosis occurs only in plant roots
4. The inability to produce energy indicates damage to the:
   a) Ribosomes b) Golgi bodies
   c) Mitochondria d) Lysosomes
5. The failure to digest cell waste indicates damage to:
   a) Ribosomes b) Lysosomes
   c) Vacuoles d) Golgi apparatus
6. Both organelles mentioned are surrounded by:
   a) Single membranes b) Double membranes
   c) Cell wall d) Protein envelope
10. The swelling of red blood cells in Solution A is due to:
    a) Diffusion of salt into the cell
    b) Movement of water into the cell
    c) Active transport of ions
    d) Decrease in internal pressure
11. Plasma membrane is :-
    (1) Selectively permeable
    (2) Permeable
    (3) Impermeable
    (4) Semipermeable
12. Power house of cell is :-
    (1) Nucleus (2) DNA
    (3) Mitochondria (4) ATP
13. Semiautonomous cell organelle is :-
    (1) Mitochondria
    (2) Ribosome
    (3) Golgi body
    (4) Peroxisome
14. Which cell organelle releases oxygen ?
    (1) Mitochondria (2) Golgi-body
    (3) Chloroplast (4) Ribosome
15. Genome is :-
    (1) Part of chromosome
    (2) Half part of a chromosome
    (3) Total DNA in cell
    (4) Total chromosomes in a gamete
16. Chromosomes are composed of :-
    (1) DNA, RNA, Histones, Non histones
    (2) DNA and Histones
    (3) DNA and RNA
    (4) DNA, RNA and Histones
17. Brush border Epithelium (Microvilli containing) found in:-
    (1) PCT (2) Loop of Henle
    (3) Collecting duct (4) Bowman's capsule
18. The epidermis of the leaf is covered by a waxy layer called:
    (1) Stomata (2) Cuticle
    (3) Trichomes (4) Guard cells

Rough Work

19. Which pair has lignin in both?
    (1) Tracheid and collenchyma
    (2) Sclerenchyma and sieve tube
    (3) Sclerenchyma and tracheid's
    (4) Parenchyma and endodermis
20. Grafting is possible among dicot plants but not in monocot plants. This is due to presence of one of the following conditions in dicot plant.
    (1) Presence of open vascular bundles
    (2) Presence of collenchymas tissues
    (3) Presence of intercalary meristem
    (4) Larger diameter of stem
21. Which of the following explains the floating of ice on water?
    (1) ice is more dense than water
    (2) ice is less dense than water
    (3) ice and water both are equally dense
    (4) None of these
22. Which among the following has the highest kinetic energy of particles?
    (1) Ice
    (2) Water
    (3) Steam
    (4) All have equal energy
23. What is the SI unit of pressure?
    (1) Newton (2) Pascal
    (3) Joule (4) Kelvin
24. Which of the following does affect the rate of evaporation?
    (1) Temperature (2) Surface area
    (3) Wind speed (4) All of the above
25. Which phenomenon explains why camphor disappears when kept in open air?
    (1) Condensation (2) Sublimation
    (3) Evaporation (4) Melting
26. Why does the temperature remain constant during the melting of ice?
    (1) Heat supplied increases temperature
    (2) Heat supplied breaks intermolecular forces
    (3) Heat supplied increases partide speed
    (4) Heat supplied decreases volume
27. A few drops of perfume spread quickly in the entire room. Which property of particles does this show?
    (1) Particles have negligible volume
    (2) Partides move continuously
    (3) Particles do not attract each other
    (4) Particles have high density
28. Which of the following will evaporate faster: acetone, water, or alcohol (at room temperature)?
    (1) Water (2) Alcohol
    (3) Acetone (4) All equally
29. Latent heat of vaporisation of water is 2260 kJ/kg. What does it mean?
    (1) Heat needed to convert 1 kg of water into ice at 0°C
    (2) Heat needed to convert 1 kg of water into steam at 100°C without change in temperature
    (3) Heat needed to raise 1 kg water by 1°C
    (4) Heat released when 1 kg of steam condenses

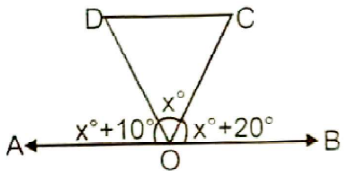
Rough Work

30. Which of the following explains the fact that a desert cooler works better on a hot, dry day than on a humid day?
    (1) High temperature increases evaporation rate
    (2) Low humidity increases evaporation rate
    (3) Wind speed reduces evaporation
    (4) Both (1) & (2)
31. Which of the following examples shows inertia of direction?
    (1) A person falls backward when a bus starts suddenly
    (2) A person falls forward when a bus stops suddenly
    (3) Mud sticking to the cycle tyre is thrown off tangentially
    (4) A book remains at rest on a table until pushed
32. A bullet of mass 0.01 kg is fired with velocity 500 m/s. Its momentum is:
    (1) 0.5 kg m/s (2) 5 kg m/s
    (3) 50 kg m/s (4) 5000 kg m/s
33. The impulse delivered to a body is equal to:
    (1) Change in acceleration
    (2) Change in momentum
    (3) Mass x Force
    (4) Mass x Displacement
34. The relation between 1 Newton and dyne is:
    (1) 1 N = 103 dyne (2) 1 N = 10^{o} dyne
    (3) 1 N = 105 dyne (4) 1 N = 105 dyne
35. Which of the following statements is correct?
    (1) Sliding friction > Rolling friction
    (2) Rolling friction > Sliding friction
    (3) Both are equal
    (4) None of these
36. A block of mass 5 kg is kept on a horizontal surface. If the coefficient of friction is 0.2, the limiting friction is (Take g = 10 m/s^2):
    (1) 5 N (2) 10 N
    (3) 15 N (4) 20 N
37. A gun of mass 5 kg fires a bullet of mass 50 g with a velocity of 200 m/s. The recoil velocity of the gun will be:
    (1) +2.0 m/s (2)-2.0 m/s
    (3) +0.2 m/s (4)-0.2 m/s
38. A block of 2 kg is acted upon by two opposite forces 10 N and 6 N. The acceleration of the block will be:
    (1) 5 m/s^2 (2) 3 m/s^2
    (3) 2 m/s^2 (4) 7 m/s^2
39. A block of mass 2 kg moving with a velocity of 4 m/s collides with a stationary block of mass 3 kg. If the blocks stick together, their common velocity is:
    (1) 1.2 m/s (2) 1.4 m/s
    (3) 1.6 m/s (4) 1.8 m/s
40. A rocket ejects gases at velocity 1000 m/s relative to it. The rate of mass ejected is 5 kg/s. The thrust produced is:
    (1) 2000 N (2) 3000 N
    (3) 4000 N (4) 5000 N

Rough Work

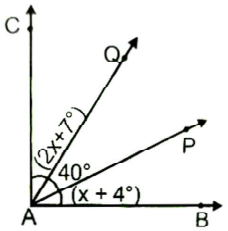
MATHS

41. In the given figure, if OCD is an isosceles triangles in which OD and OC are equal, then what will be the value oof $\angle OCD$?



(1) 70° (2) 50°
(3) 65° (4) 45°

42. In the given figure $AC \perp AB$. Find (i) $\angle BAP$ (ii) $\angle CAQ$.



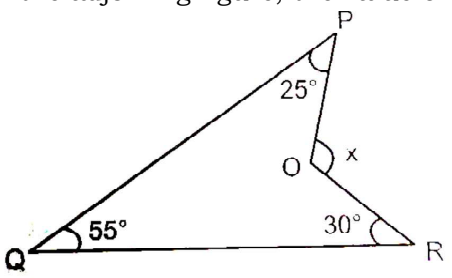
(i) (ii)
(1) 15° 45°
(2) 17° 45°
(3) 15° 33°
(4) 17° 33°

43. In an equilaterial triangle ABC, the side BC is trisected at D,then $9AD^2$ is :
(1) $7AB^2$ (2) $8BC^2$
(3) $4AC^2$ (4) $\frac{3}{2}AB^2$

44. A, B, C are the three angles of a triangle. A - B = 20 deg B - C = 35°, then angle $\angle A, \angle B, \angle C$ are :
(1) 85°, 65°, 30° (2) 65°, 80°, 45°
(3) 80°, 65°, 35° (4) 80°, 30°, 65°

43. Four congruent triangular corners are cut off a rectangle of dimension 11cm×13cm. The resulting Octagon has eight edges of equal length. The length of the edge of octagon is
(1) 7 cm (2) 5 cm
(3) 4 cm (4) 8 cm

44. In the adjoining figure, the value of x is :



(1) 250° (2) 110°
(3) 120° (4) 80°

45. In a ΔABC if $2\angle A = 3\angle B = 6\angle C$ then $\angle A, \angle B, \angle C$ respectively are :
(1) 30°, 60°, 90° (2) 90°, 60°, 30°
(3) 30°, 90°, 60° (4) None of these

46. ΔABC is a right angled triangle with A = 90°, AB = b cm, AC = a cm, and BC = c cm A circle is inscribed in this triangle. The radius of the circle, in cm, is :
(1) a + b - c (2) $\frac{1}{2}(a+b-c)$
(3) $\frac{1}{2}(a+b+c)$ (4) $\sqrt{a^2+b^2+c^2}$

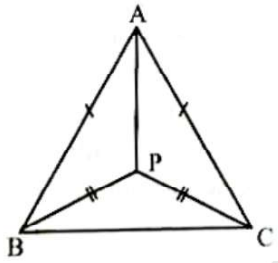
47. The ratio of the length of a side of an equilateral triangle and its height is :
(1) $1:\sqrt{3}$ (2) $\sqrt{3}:2$
(3) $2:\sqrt{3}$ (4) $\sqrt{3}:1$

Rough Work

48. Fill in the blanks and select the correct option.
(i) The sum of any two sides of a triangle is greater than __P__ the median drawn to the third side.
(ii) The perimeter of a triangle is __Q__ than the sum of its three medians.
(iii) If the altitude from the vertex of a triangle bisects the base, the triangle is __R__.

	P	Q	R
(1)	Twice	less	isosceles
(2)	Twice	greater	isosceles
(3)	Half	less	equilateral
(4)	Half	greater	equilateral

49. In the given figure, ΔABC and ΔPBC are two isosceles triangles on the same base BC and vertices A and P arc on the same side of BC. If A and P are joined, then



(a) $\angle BPA = \frac{1}{2}\angle BAC$ (b) $\angle BPA = \frac{1}{2}\angle BAC$

(c) $\angle CPA = \frac{1}{2}\angle BAC$ (d) $\angle BAP = 2\angle BAC$

50. If $x = 8 - 2\sqrt{15}$ then $\sqrt{x} + \frac{2}{\sqrt{x}} =$

(1) $\sqrt{5}$ (2) $2\sqrt{5}$

(3) $3\sqrt{5}$ (4) $4\sqrt{5}$

51. If the point (3, 4) lies on the graph of the equation 3y=ax + 7, then the value of a is _____.

(1) $\frac{2}{3}$ (2) 1

(3) $\frac{4}{3}$ (4) $\frac{5}{3}$

52. I am three times as old as my son. Five years later, I shall be two and a half times as old as my son. How old am I and how old is my son ?

(1) 40, 23 (2) 45, 15

(3) 45, 20 (4) 50, 20

53. The point on the y-axis which is equidistant from A (-5,-2) and B (3, 2) is:

(1) (-4,0) (2) (0,-2)

(3) (-2, 0) (4) (0,-4)

54. The three points (-2, 2), (8,2) and (-4, -3) are the vertices of:

(1) An isosceles triangle

(2) An equilateral triangle

(3) A right angled triangle

(4) None of these

55. $\left(1-\frac{1}{3}\right)\left(1-\frac{1}{4}\right)\left(1-\frac{1}{5}\right).....\left(1-\frac{1}{n}\right)$ equals :

(1) $\frac{1}{n}$ (2) $\frac{2}{n}$

(3 $\frac{3}{n}$ (4) $\frac{4}{n}$

56. $\left[\frac{(32)^{0.2} + (81)^{0.25}}{(256)0.5 - (121)^{0.5}}\right] =$ _____

(1) 2 (2) 5

(3) 1 (4) 11

Rough Work

57. If the points A (6, 1), B (8, 2), C(9,4) and D (P, 3) are the vertices of a parallelogram taken in order. Then the value of P is:
(1) 7 (2) 8
(3) 4 (4)9

58. If the mid point of the line-segment joining the points (-7, 14) and (K, 4) is (a, b), where 2a + 3b = 5 then the value of K is:
(1) K = 15 (2) K = - 7
(3) K = –15 (4) K = 10

59. m, n are zeros of $ax^2 - 5x + c$ find the value of a and c. If m + n = mn = 10 m
(1) a = ½, c = 5 (2) a = 1, c = 6
(3) a = 2 c = 8 (4) a = 0 c = 3

60. The remainder when $3x^4 - 2x^3 + 4x^2 - 5$ is divided by x + 3.
(1) –328 (2) 328
(3) 232 (4) 47

61. The number of point of intersection of the polynomial $p(x) = x^3 + 8$ with x-axis is
(1) 0 (2) 1
(3) 2 (4) 3

62. A fraction becomes $\frac{4}{5}$ when 1 is added to each of the numerator and denominator. However, if we subtract 5 from each one then it becomes $\frac{1}{2}$. The fraction is –
(1) $\frac{5}{8}$ (2) $\frac{5}{6}$
(3) $\frac{7}{9}$ (4) $\frac{13}{16}$

63. Find the point P(x, y) if its distance from (-3, 0) & (3, 0) is 4 units individually :
(1) $\left(0, \sqrt{5}\right)$ (2) $\left(0, -\sqrt{5}\right)$
(3) $\left(0, -\sqrt{7}\right)$ (4) None of these

64. The ratio in which the line segment joining (3, 4) and (-2,-1) is divided by the x-axis is :
(1) 3:2 (2) 4:1
(3) 4:3 (4) None of these

65. What is the minimum number of lines required to make a closed figure?
(1) One (2) Two
(3) Three (4) Four

66. Which of the following is an axiom?
(1) Theorems
(2) Definitions
(3) The universal truth in all branches of Mathematics
(4) Universal truth specific to geometry

67. What do you call a figure formed by two straight lines having a common point?
(1) Angle (2) Triangle
(3) Rhombus (4) Kite

68. How many lines can pass through one point?
(1) One (2) Two
(3) Three (4) infinite

69. How many dimension does a surface has?
(1) One (2) Two
(3) Three (4) Four

70. The distance of the point (3, 5) from x - axis is
(1) $\sqrt{34}$ (2) 3
(3) 5 (4) None of these

Rough Work

71. Ordinate of all points on the x - axis is
(1) 0 (2) 1
(3) –1 (4) Any number

72. The end points of the longest chord of a circle are (-4, 2) and (-6, -8). Find the centre.
(1) $\left(-\frac{10}{3}, -2\right)$ (2) $(-5, -2)$
(3) $(-5, -4)$ (4) $(-5, -3)$

73. Let R_1 and R_2 are the remainders when the polynomials x 3 + $2x^2$ – 7 and x^3 + ax^2 –12x +6 are divided by x + 1 and x – 2 respectively. If $2R_1 + R_2$ = 6 find the value of a.
(1) –2 (2) 2
(3) 3 (4) –3

74. If A = $4x^3$ – 5x + 7, B = $2x^3$ + x^2 + 3 and C = $5x^3$ - $8x^2$ + 10 then A – 2B - C ?
(1) $5x^3 – 2x^2 + x + 4$ (2) $–5x^3 + 6x^2 – 5x – 9$
(3) $x^3 + 10x^2 – 5x + 9$ (4) 5x^3 - 8x ^ 2 + x - 1

75. Factors of $(x + y)^3 – (x – y)^3$ is :
(1) $2xy (3x^2 + y^2)$ (2) $xy (3x^2 + y^2)$
(3) $2y (3x^2 + y^2)$ (4) $3x^2 + y^2$

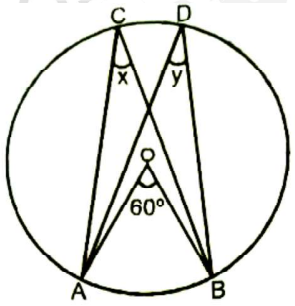
76. Factorize: $49y^2 – 14y + 1 - 25x^2$
(1) (7y – 1 + 5x)(7y – 1 – 5x)
(2) (5x – 1 + 7y)(5x – 1 – 7y)
(3) (7y – 1 + 5x)(7y + 1 + 5x)
(4) (5x + 7y – 1)(5x + 7y + 1)

77. If x + y = 15 and x - y = 1 then root(x, 3) =
(1) 8 (2) –8
(3) 2 (4) –2

78. Sum of the digits of a 2-digit number is 9. When the digits are reversed (interchanged), it is found that the resulting number is greater than the original number by 27. Find the number.
(1) 63 (2) 45
(3) 54 (4) 36

79. A rational number between $\frac{1}{7}$ and $\frac{2}{7}$ is :
(1) $\frac{1}{14}$ (3) $\frac{2}{21}$
(2) $\frac{5}{14}$ (4) $\frac{5}{21}$

80. In the given figure, find the value of y.



(1) 35° (2) 60°–x°
(3) 60°+x° (4) 12°

Reasoning

81. TREE : LEAF :: FLOWER :
A) Petal B) Root
C) Fruit D) Stem

82. BOOK : PAGES :: BUILDING : ?
A) Bedroom B) Rooms
C) Kitchen D) Windows

83. WATER : THIRST :: FOOD : ?
A) Energy B) Hunger
C) Health D) Weakness

84. OXYGEN : LIFE :: FUEL : ?
A) Fire B) Smoke
C) Cold D) Light

Rough Work

85. MOTHER : DAUGHTER :: FATHER : ?
A) Son B) Uncle
C) Nephew D) Brother

86. PEN : WRITE :: KNIFE : ?
A) Cut B) Cone
C) Sharp D) Break

87. DOCTOR : HOSPITAL :: TEACHER : ?
A) Classroom B) School
C) Student D) Book

88. CLOCK : TIME :: THERMOMETER : ?
A) Pressure B) Speed
C) Heat D)Temperature

89. Find the odd one out:
A) Rose B) Jasmine
C) Lotus D) Mango

90. Find the odd one out:
A) Iron B) Copper
C) Brass D) Gold

91. Find the odd one out:
A) Lion B) Tiger
C) Cheetah D) Snake

92. Find the odd one out:
A) Square B)Rectangle
C) Triangle D) Circle

93. Find the odd one out:
A) Ear B) Eye
C) Nose D) Hand

94. Find the odd one out:
A) Mercury B) Venus
C) Earth D) Moon

95. Find the odd one out:
A) Oxygen B) Nitrogen
C) Carbon Dioxide D) Hydrogen

96. Which digit will appear on the face opposite to the face with number 3?

(1) 2 (2) 4
(3) 6 (4) 5

97. 92 : 18 : : 27 : ?
(1) 37 (2) 47
(3) 57 (4) 14

98. 30:130 :: ? : ?
(1) 20: 120 (2) 37: 210
(3) 42: 222 (4) 49: 350

99. Gopal started walking 2 km straight from his school. Then he turned right and walked 1 km. Again he turned right and walked 1 km to reach his house. If his house is south-east from his school, then in which direction did Gopal start walking from the school?
(1) East (2) West
(3) South (4) North

100. IF UNIVERSITY is written as 1273948756, how can TRUSTY be written in that code ?
(1) 542856 (2) 531856
(3) 541856 (4) 541956

Rough Work