MODEL QUESTION PAPER OF APGET SCHOLARSHIP 2024-25 (FOR CBSE/STATE SYLLABUS)	**SUBJECT** **SCIENCE & MATHEMATICS**

1. The image formed by a concave mirror is observed to be virtual, erect and larger than the object. Where should be the position of the object?
   (a) Between the principal focus and the centre of curvature
   (b) At the centre of curvature
   (c) Beyond the centre of curvature
   (d) Between the pole of the mirror and its principal focus.

2. Where an object should be placed in front of a convex lens to get a real image of the size of the object?
   (a) At the principal focus of the lens   (b) At twice the focal length
   (c) At infinity   (d) Between the optical centre of the lens and its principal focus.

3. A spherical mirror and a thin spherical lens have each a focal length of -15 cm. The mirror and the lens are likely to be
   (a) both concave.   (b) both convex.
    (c) the mirror is concave and the lens is convex.
    (d) the mirror is convex, but the lens is concave.

4. No matter how far you stand from a mirror, your image appears erect. The mirror is likely to be
   (a) only plane.   (b) Only concave.
    (c) Only convex.   (d) Either plane or convex.

5. Which of the following lenses would you prefer to use while reading small letters found in a dictionary?
   (a) A convex lens of focal length 50 cm.   (b) A concave lens of focal length 50 cm.
   (c) A convex lens of focal length 5 cm.   (d) A concave lens of focal length 5 cm.

6. The human eye can focus on objects at different distances by adjusting the focal length of the eye lens. This is due to
   (a) presbyopia.   (b) accommodation.   (c) near-sightedness.   (d) far-sightedness.

7. The change in focal length of an eye lens is caused by the action of the
   (a) pupil.   (b) retina.   (c) ciliary muscles.   (d) iris.

8. A piece of wire of resistance R is cut into five equal parts. These parts are then connected in parallel. If the equivalent resistance of this combination is R', then the ratio R/R' is -
   (a) 1/25   (b) 1/5   (c) 5   (d) 25

9. An electric bulb is rated 220 V and 100 W. When it is operated on 110 V, the power consumed will be
   (a) 100 W   (b) 75 W   (c) 50 W   (d) 25 W

10. 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

11. An electric bulb is connected to a 220 V generator. The current is 0.50 A. What is the power of the bulb?
    (a) 110W   (b) 200W   (c) 40W   (d)80W
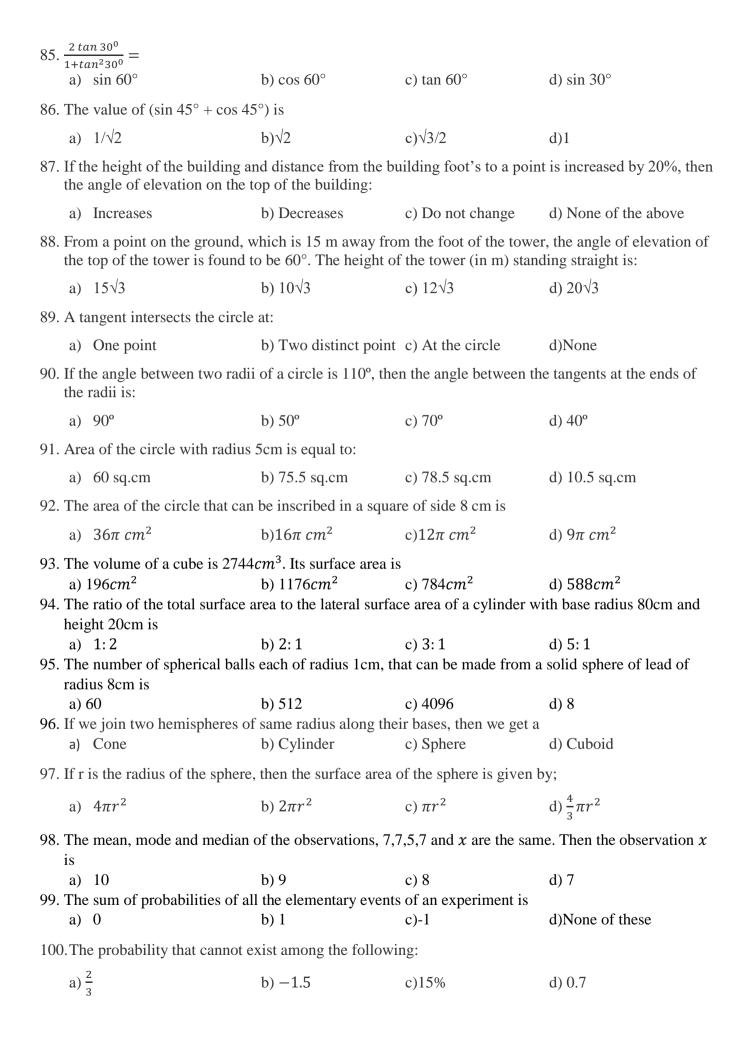
12. An electric refrigerator rated 400 W operates 8 hour/day. What is the cost of the energy to operate it for 30 days at Rs 3.00 per kW h?

(a) 150   (b)288   (c) 350   (d)100

13. Which of the following correctly describes the magnetic field near a long straight wire?

(a) The field consists of straight lines perpendicular to the wire.

(b) The field consists of straight lines parallel to the wire.

(c) The field consists of radial lines originating from the wire.

(d) The field consists of concentric circles centred on the wire.

14. The phenomenon of electromagnetic induction is

(a) the process of charging a body.

(b) the process of generating magnetic field due to a current passing through a coil.

(c) producing induced current in a coil due to relative motion between a magnet and the coil.

(d) the process of rotating a coil of an electric motor.

15. Most of the sources of energy we use represent stored solar energy. Which of the following is not ultimately derived from the Sun's energy?

(a) geothermal energy   (b) wind energy

(c) nuclear energy   (d) bio-mass.

16. Baking powder contains sodium hydrogen carbonate and

(a) Tartaric acid   (b) Sulphuric acid   (c) Hydrochloric acid   (d) Acetic acid

17. The solution with the lowest concentration of H^+ ion is

(a) pH=7   (b) pH=8.6   (c) pH=2.0   (d) pH=6.8

18. Plaster of Paris is obtained

(a) By heating water to calcium sulphate   (b) By heating sulphuric acid to calcium hydroxide

(c) By heating gypsum to a very high temperature (d) By heating gypsum to a 100 °C

19. When lead nitrate reacts with potassium iodide, yellow precipitate of

(a) PbI_2 is formed   (b) KNO_3 is formed   (c) $Pb(NO_3)_2$ is formed   (d) $PbIO_3$ is formed

20. In an endothermic reaction

(a) Heat is absorbed   (b) Heat is liberated

(c) Heat is neither liberated nor absorbed   (d) both (a) and (b)

21. $AgNO_3(aq) + NaCl\ (aq) \rightarrow AgCl(s) + NaNO_3(aq)$. The above reaction is

(a) Precipitation reaction   (b) Double displacement reaction

(c) Combination reaction   (d) both (a) and (b)

22. $X\ HNO_3 + Ca(OH)_2 \rightarrow Ca(NO_3)_2 + YH_2O$

X and Y in the above equation respectively

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

23. Complete the reaction $Zn + 2NaOH \rightarrow$

a) $Zn(OH)_2 + H_2$ (b) $Na_2ZnO_2 + H_2$

(c) $Zn(OH)_2 + Na_2O$ (d) $Na_2ZnO_2 + Na_2O$

24. Which of the following metal cannot be refined by electrolytic refining?

(a) Cu   (b) Ag   (c) Ni   (d) Na

25. All the members of homologous series of alkynes have the general formula

(a) C_nH_{2n} (b) C_nH_{2n+2} (c) C_nH_{2n-2} (d) C_nH_{2n-4}

26. C_2H_4 reacts with hydrogen in presence of Ni gives

(a) CH_4 (b) C_2H_6 (c) $HCOOH$ (d) $HCHO$

27. The IUPAC name of the compound $CH_2 = C(CH_3)_2$ is

(a) 1, 1 dimethylprop-2-ene   (b) 2-methylprop-1-ene

(c) 2-ethyl-3, 3-dimethylbutane   (d) 2, 3-dimethylhexane

28. A redox reaction is the one in which

(a) Both the substances are reduced   (b) Both the substances are oxidised

(c) An acid is neutralised by the base

(d) One substance is oxidised while the other is reduced

29. Which gas is evolved when acids react with metal carbonates?
    (a) CO_2 (b) H_2 (c) NH_3 (d) O_2

30. The metal that reacts with cold water
    (a) Aluminium   (b) zinc   (c) sodium   (d) iron

31. Which of the following structure is the site for complete digestion of carbohydrates, proteins and fats?
    (a) Mouth   (b) Stomach   (c) Small Intestine   (d) Large Intestine

32. Identify the incorrect statement from the following
    (a) CO_2 is less soluble than O_2 in water.
    (b) Haemoglobin is present in red blood cells.
    (c) In humans, O_2 is carried by red blood cells.
    (d) Rings of cartilage are present in throat.

33. The main thinking part of the brain is
    (a) Forebrain   (b) Hindbrain   (c) Midbrain   (d) All of these

34. Match the column I with column II and choose the most appropriate option

	Column I		Column II
1	Growth hormone	A	Ovary
2	Adrenaline	B	Testes
3	Estrogen	C	Adrenal
4	Testosterone	D	Pituitary gland

    (a) 1-D, 2-C, 3-A, 4-B   (b)1-D, 2-C, 3-B, 4-A (c) 1-B, 2-C, 3-D, 4-A(d)1-A, 2-C, 3-D, 4-B

35. The disease Kala-Azar is caused by
    (a) Leishmania   (b) Amoeba   (c) Euglena   (d) Paramecium

36. Identify the incorrect match from the following with respect to mode of reproduction in organisms
    (a) Amoeba- Binary fission   (b) Leishmania- Regeneration
    (c) Hydra- Regeneration   (d) Bacteria- Cell division

37. Spore formation is a mode of reproduction in which of the following organism?
    (a) Bryophyllum   (b) Rhizopus   (c) Amoeba   (d) Planaria

38. The number of chromosomes present in humans is
    (a) 21 pairs   (b) 22 pairs   (c) 23 pairs   (d) 24 pairs

39. In peas, a pure tall plant in homozygous condition is crossed with a pure dwarf plant in homozygous condition. The ratio of pure tall plants to pure dwarf plants in the F2 generation is
    (a) 1:1   (b)1:2   (c) 1:3   (d)1:4

40. Humans have two different sex chromosomes such as X and Y. Which of the following statement about these two chromosomes is correct?
    (a) Offspring will inherit chromosomes from only one parent
    (b)Male offspring will inherit both X and Y chromosomes from father only
    (c) Female offspring will inherit both X chromosomes from mother only
    (d)Male offspring will inherit X chromosome from mother and Y chromosome from father

41. According to Darwin, evolution takes place due to
    (a) Mutation   (b) Natural selection   (c) Inheritance   (d) Variation

42. According to Haldane the origin of life is from
    (a) Simple organic molecules   (b) Simple inorganic molecules
    (c) Pre-existing life   (d) All of these

43. Evolution of wild cabbage is termed as
    (a) Artificial selection   (b) Natural selection   (c) Mutation   (d) Genetic drift

44. The modern day humans have their ancestors lived in
    (a) Australia   (b) Asia   (c) Africa   (d) China

45. Which of the following statement describes the function of decomposers?
    (a) Conversion of organic material into inorganic material
    (b) Conversion of inorganic material into organic material

(c) Breakdown of inorganic material very simple material

(d) All of these

46. What is the percentage of solar energy captured by green plants present in the terrestrial ecosystem?

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

47. The full form of UNEP is

(a) United nations environment programme (b) Union of nations environment programme

(c) United nations ecosystem programme (d) Union of nations ecosystem programme

48. 'Kulhs' is the ancient water harvesting structure were made in

(a) Manipur (b) Bihar (c) Himachal Pradesh (d) Uttar Pradesh

49. Amrita Devi Bishnoi sacrificed her life to protect the

(a) Palm trees (b) Khejri trees (c) Sal trees (d)Teakwood trees

50. The Tehri dam is constructed on River

(a) Yamuna (b) Bhagirathi (c) Ravi (d) Sutlej

51. 140 can be expressed as a product of the prime factors as

a) $2^3 \times 5 \times 7$ b)$2^2 \times 5 \times 7$ c)$2^3 \times 3 \times 7$ d)$2^2 \times 3 \times 7$

52. If $(-1)^n + (-1)^{4n} = 0$, then n is

a) Any positive integer c) Any odd natural number

b) Any negative integer d) Any even natural number

53. The number $3^{13} - 3^{10}$ is divisible by

a) 2 and 3 only b)3 and 10 only c)2,3 and 10 only d)2,3 and 13

54. The $H.C.F$ of 280 and 674 is

a) 2 b)4 c)14 d)28

55. If $H.C.F\ (a, b) = 12$ and $a \times b = 1800$, then $L.C.M\ (a, b) =$

a) 3600 b)900 c)150 d)90

56. Which of the following is not a polynomial?

a) $\sqrt{3}x^2 - 2\sqrt{3}x + 3$ c) $x + \frac{1}{x}$

b) $\frac{3}{2}x^3 - 5x^2 - \frac{1}{\sqrt{2}}x - 1$ d) $5x^2 - 3x + \sqrt{2}$

57. If $p(y) = 3y^4 - 5y^3 + y^2 + 8$, then $p(-1)$ will be

a) 2 b)15 c)17 d)-17

58. Degree of polynomial $y^3 - 2y^2 - \sqrt{3}y + \frac{1}{2}$ is

a) $\frac{1}{2}$ b) 2 c) 3 d) 4

59. The sum and product of the zeroes of a quadratic polynomial are 2 and -15 respectively. The quadratic polynomial is

a) $x^2 - 2x + 15$ b)$x^2 - 2x - 15$ c)$x^2 + 2x - 15$ d)$x^2 + 2x + 15$

60. If the sum of the zeroes of the quadratic polynomial $f(t) = kt^2 + 2t + 3k$ is equal to their product, then the value of k is

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

61. If the pair of linear equations $x - y = 1, x + ky = 5$ has unique solution $x = 2, y = 1$, then the value of k is

a) -2 b)3 c)2 d)4

62. The pair of linear equations $2kx + 5y = 7, 6x - 5y = 11$ has a unique solution if

a) $k \neq -3$ b)$k \neq 6$ c) $k \neq 5$ d) $k \neq -5$

63. The pair of linear equations $2x + 5y = k$ and $kx + 15y = 18$ has infinitely many solutions if

a) $k = 3$ b)$k = 6$ c) $k = 9$ d) $k = 18$

64. The pair of linear equations $x + 2y = 5$ and $3x + 12y = 10$ has

a) Unique solution c) More than two solutions

b) No solution d) Infinitely many solutions

65. Which of the following is the solution of the pair of equations $3x - 2y = 4$ and $6x - 4y = 8$?

a) $x = 2, y = 1$ b) $x = 4, y = 4$ c) $x = 6, y = 7$ d) All of these

66. Solutions of the quadratic equation $6x^2 + 7x - 10 = 0$ are
   a) $\frac{5}{6}, -2$ b) $\frac{6}{5}, 2$ c) $\frac{5}{6}, 2$ d) $-\frac{5}{6}, -2$

67. If $x = k$ be a solution of the quadratic equation $x^2 + 4x + 3 = 0$, then $k = -1$ and
   a) 2   b) -3   c) 3   d) -2

68. The positive real root of the equation $64x^2 - 1 = 0$ is
   a) 8   b) $\frac{1}{16}$ c) $\frac{1}{8}$ d) $\frac{1}{4}$

69. The discriminant of the quadratic equation $3x^2 - 4x - 2 = 0$
   a) 40   b) 20   c) 24   d) 48

70. If the equation $x^2 + 4x - k = 0$ has real and distinct roots, then
   a) $k < -4$ b) $k > -4$ c) $k \le -4$ d) $k \ge -4$

71. In an arithmetic progression if a = 10 and d = 10, then first four terms will be:
   a) 10, 30, 50, 60   b) 10,20, 30, 40   c) 10, 15, 20, 25   d) 10, 18, 20, 30

72. The first term and common difference for the A.P. 3, 1, -1, -3 is
   a) 1 and 3   b) -1 and 3   c) 3 and -2   d) 2 and 3

73. The missing terms in AP: __, 13, __, 3 are:
   a) 11 and 9   b) 17 and 9   c) 18 and 8   d) 18 and 9

74. The 21st term of AP whose first two terms are -3 and 4 is:
   a) 17   b) 137   c) 143   d)-143

75. The 10th term of the AP: 5, 8, 11, 14, … is
   a) 32   b) 35   c) 38   d)185

76. If perimeter of a triangle is 100 cm and the length of two sides are 30 cm and 40 cm, the length of third side will be:
   a) 30 cm   b) 40 cm   c) 50 cm   d) 60 cm

77. The height of an equilateral triangle of side 5 cm is:
   a) 4.33 cm   b) 3.9 cm   c) 5 cm   d) 4 cm

78. Sides of two similar triangles are in the ratio 4: 9. Areas of these triangles are in the ratio
   a) 2: 3   b) 4: 9   c) 81: 16   d) 16: 81

79. If the distance between the points $A(2, -2)$ and $B(-1, x)$ is equal to 5, then the value of x is:
   a) 2   b) -2   c) 1   d) -1

80. The midpoint of a line segment joining two points $A(2, 4)$ and $B(-2, -4)$ is
   a) (-2, 4)   b) (2, -4)   c) (0, 0)   d) (-2, -4)

81. The distance of point $A(2, 4)$ from the x-axis is
   a) 2 units   b) 4 units   c) -2 units   d) -4 units

82. In Δ ABC, right-angled at B, AB = 24 cm, BC = 7 cm. The value of tan C is:
   a) 12/7   b) 24/7   c) 20/7   d) 7/24

83. (Sin 30°+cos 60°)-(sin 60° + cos 30°) is equal to:
   a) 0   b) 1+2√3   c) 1-√3   d)1+√3

84. If $cos\ x = \frac{2}{3}$ then $tan\ x$ is equal to:
   a) 5/2   b) √(5/2)   c) √5/2   d) 2/√5

85. $\frac{2 \tan 30^0}{1+\tan^2 30^0} =$

    a) $\sin 60°$ b) $\cos 60°$ c) $\tan 60°$ d) $\sin 30°$

86. The value of $(\sin 45° + \cos 45°)$ is

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

87. If the height of the building and distance from the building foot's to a point is increased by 20%, then the angle of elevation on the top of the building:

    a) Increases   b) Decreases   c) Do not change   d) None of the above

88. From a point on the ground, which is 15 m away from the foot of the tower, the angle of elevation of the top of the tower is found to be 60°. The height of the tower (in m) standing straight is:

    a) $15\sqrt{3}$ b) $10\sqrt{3}$ c) $12\sqrt{3}$ d) $20\sqrt{3}$

89. A tangent intersects the circle at:

    a) One point   b) Two distinct point   c) At the circle   d)None

90. If the angle between two radii of a circle is 110º, then the angle between the tangents at the ends of the radii is:

    a) 90º   b) 50º   c) 70º   d) 40º

91. Area of the circle with radius 5cm is equal to:

    a) 60 sq.cm   b) 75.5 sq.cm   c) 78.5 sq.cm   d) 10.5 sq.cm

92. The area of the circle that can be inscribed in a square of side 8 cm is

    a) $36\pi \ cm^2$ b)$16\pi \ cm^2$ c)$12\pi \ cm^2$ d) $9\pi \ cm^2$

93. The volume of a cube is $2744 cm^3$. Its surface area is

    a) $196 cm^2$ b) $1176 cm^2$ c) $784 cm^2$ d) $588 cm^2$

94. The ratio of the total surface area to the lateral surface area of a cylinder with base radius 80cm and height 20cm is

    a) $1:2$ b) $2:1$ c) $3:1$ d) $5:1$

95. The number of spherical balls each of radius 1cm, that can be made from a solid sphere of lead of radius 8cm is

    a) 60   b) 512   c) 4096   d) 8

96. If we join two hemispheres of same radius along their bases, then we get a

    a) Cone   b) Cylinder   c) Sphere   d) Cuboid

97. If r is the radius of the sphere, then the surface area of the sphere is given by;

    a) $4\pi r^2$ b) $2\pi r^2$ c) πr^2 d)$\frac{4}{3}\pi r^2$

98. The mean, mode and median of the observations, 7,7,5,7 and x are the same. Then the observation x is

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

99. The sum of probabilities of all the elementary events of an experiment is

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

100. The probability that cannot exist among the following:

    a) $\frac{2}{3}$ b) -1.5 c)15%   d) 0.7

Q.NO.	OPTION	DESCRIPTION
1.	**4**	Between the pole of the mirror and its principal focus. A concave mirror forms a virtual and erect image only when the object is placed between the poles of the mirror and it's principal focus. This image is larger than the size of object, ie, it is magnified.
2.	**2**	At twice the focal length The object should be placed at twice the focal length in front of a convex lens to get a real image of the size of the object.
3.	**1**	Since focal length is negative both lens and mirror is concave
4.	**4**	The correct option is (a) and (c) above. In a plane mirror, the image formed is always erect. In a convex, the image formed is always virtual and erect, irrespective of where the object is placed. Thus, the mirror in this case, is likely to be either plane or convex in nature.
5.	**4**	A convex lens gives a magnified image of an object when it is placed between the radius of curvature and focal length. Also, magnification is more for convex lenses having shorter focal length. Therefore, for reading small letters found in a dictionary, a convex lens of focal length 5 cm should be used.
6.	**2**	The process of adjusting the focal length of a lens to keep an object in focus on the retina as its distance from the eye varies is called the accommodation of the eye.
7.	**3**	The focal length of the eye lens changes due to the action of ciliary muscles. The focal length of the lens is changed when the ciliary muscle forces the lens to change shape. This enables us to see the image of objects at different distances.
8.	**4**	Resistance of this wire, $R = \rho \frac{l}{A}$ Resistance of a piece of length $\frac{l}{5} = \rho \frac{l}{5A} = \frac{R}{5}$ The equivalent resistance of the 5 wires in parallel is R'. Then $$\frac{1}{R'} = \frac{1}{R/5} + \frac{1}{R/5} + \frac{1}{R/5} + \frac{1}{R/5} + \frac{1}{R/5}$$ $$\frac{1}{R'} = \frac{5}{R} + \frac{5}{R} + \frac{5}{R} + \frac{5}{R} + \frac{5}{R}$$ $$\frac{1}{R'} = \frac{25}{R}$$ $$\frac{R}{R'} = 25$$
9.	**4**	Resistance of the bulb is given by, $$R = \frac{V^2}{P} = \frac{220^2}{100}$$ $$= 484\Omega$$ Power consumed by the bulb when operated on 110 V, $$P = \frac{V^2}{R} = \frac{110^2}{484}$$ $$= 25 \text{ W}$$
10.	**3**	For series combination

		Total resistance $R = R_1 + R_2 + \cdots \ldots \ldots$
		So calculating the series resistance in the given combination we get $\Rightarrow R_p = R + R = 2R - $ (i)
		For parallel combination
		Total resistance $1/R = 1/R_1 + 1/R_2 + \cdots \ldots \ldots \ldots$
		So calculating the parallel resistance in the given combination we get $$\Rightarrow 1/R_p = 1/R + 1/R$$ $$\Rightarrow 1/R_p = 2/R$$ $$\Rightarrow R_p = R/2 - \text{ (ii)}$$ To find the ratio we will combine equations (i) and (ii) we get $$\Rightarrow R_p/R_s = (R/2)/2R = 1/4$$ The ratio of heat produced is $1:4$.
11.	1	Voltage $(V) = 220$ V Current $(I) = 0.5 A$. The voltage and current of a bulb are given, the power is calculated through the derived formula of Power. And we know that Power $=$ Voltage $\times$ Current $$P = 220 \times 0.5$$ $$P = 22 \times 0.5$$ $$P = 110 W$$ Thus, the required power is 110 W
12.	2	Power of the electric refrigerator, $P = 400$ W $= \frac{400}{1000}$ kW $= 0.4$ kW Time for which the refrigerator operates, t $= 30 \times 8$ h $= 240$ h $\therefore$ Energy consumed $=$ P $\times$ t $$= 0.4 \text{ kW} \times 240 \text{ h}$$ $$= 96\text{kWh}$$ Cost of the energy to operate refrigerator at a rate of Rs 3.00 per kWh $= 96 \times 3.00 = $ Rs288.00.
13.	4	The correct statement describing the magnetic field near a long, straight current carrying conductor is: The magnetic lines of force are in concentric circles with the wire as the center, in a plane perpendicular to the conductor.
14.	3	Producing induced current in a coil due to relative motion between a magnet and the coil.
15.	3	Nuclear energy. The energy required to fuse the lighter nuclei is provided by fission reactions. In this reaction there is no need of sunlight Therefore nuclear energy is not ultimately derived from Sun's energy. Geothermal energy, wind energy, and bio-mass are all ultimately derived from solar energy.
16.	1	Baking powder contains sodium hydrogen carbonate and tartaric acid which react in the presence of water to give CO_2
17.	2	The solution with pH more than 7 are basic in nature hence solution with pH 8.6 has less concentration of H^+ Ion and more concentration of OH^- ions

18.	4	Plaster of Paris is obtained by heating gypsum to a 100 °C
19.	1	$Pb(NO_3)_2$ (aq) + $2KI$(aq) $\rightarrow PbI_2(\downarrow)$ + $2KNO_3$ (aq) PbI_2 is yellow precipitate.
20.	1	In an endothermic reaction heat is absorbed
21.	4	In this reaction both $AgNO_3$ and $NaCl$ exchange their ions to form new compounds $AgCl$ (precipitate) and $NaNO_3$ Hence it shows both double displacement and precipitation
22.	3	$2\,HNO_3 + Ca(OH)_2 \rightarrow Ca(NO_3)_2 + 2\,H_2O$
23.	2	$Zn + 2NaOH \rightarrow Na_2ZnO_2 + H_2$
24.	4	Sodium is highly reactive so it cannot be purified by electrolytic refining
25.	3	All the members of homologous series of alkynes have the general formula C_nH_{2n-2} Example propyne (C_3H_4)
26.	2	$$C_2H_4 + H_2 \xrightarrow{Ni/Pd} C_2H_6,$$
27.	2	The IUPAC name of the compound $CH_2 = C(CH_3)_2$ is 2-Methylprop-1-ene
28.	4	A redox reaction is the one in which one substance is oxidised while the other is reduced
29.	1	CO_2 gas is evolved when acids react with metal carbonates
30.	3	Sodium metal that reacts with cold water to form sodium hydroxide
31.	3	Small intestine is the site for complete digestion of carbohydrates, proteins and fats.
32.	1	The O_2 is less soluble than CO_2 in water.
33.	1	Forebrain is the main thinking part of the brain.
34.	1	Growth hormone- Pituitary gland Adrenaline- Adrenal gland Androgens- Testes Estrogen- Ovary
35.	1	The disease Kala-Azar is caused by Leishmania.
36.	2	Leishmania shows binary fission.
37.	2	Spore formation is observed in Rhizophus.
38.	3	23 pairs of chromosomes are present in humans.
39.	1	The ratio of pure tall plants to pure dwarf plants in the F2 generation is 1:1.
40.	4	Offsprings inherit chromosomes from both the parents. The male offspring will inherit X chromosome from mother and Y chromosome from the father. The female offspring will inherit one X chromosome from mother and one X chromosome from father.
41.	2	According to Darwin, evolution takes place due to Natural selection.
42.	2	According to Haldane the origin of life is from Simple inorganic molecules.
43.	1	Evolution of wild cabbage is termed as Artificial selection.
44.	3	The modern day humans have their ancestors lived is Africa.
45.	1	Decomposers convert organic material into inorganic material.
46.	1	1% of solar energy captured by green plants present in the terrestrial ecosystem.
47.	1	UNEP - United nations environment programme.
48.	3	'Kulhs' is the ancient water harvesting structure were made in Himachal Pradesh.
49.	2	Amrita Devi Bishnoi sacrificed her life to protect Khejri trees.
50.	2	The Tehri dam is constructed on River Bhagirathi.
51.	2	$140 = 2 \times 2 \times 5 \times 7 = 2^2 \times 5 \times 7$

52.	3	$(-1)^n + (-1)^{4n} = 0$ will be possible, when n is any odd natural number.
53.	4	$3^{13} - 3^{10} = 3^{10}(3^3 - 1) = 3^{10}(26) = 3^{10} \times 2 \times 13$ Hence $3^{13} - 3^{10}$ is divisible by 2,3 and 13
54.	1	Prime factorisation of 280 and 674 are $280 = 2 \times 2 \times 5 \times 7 = 2^3 \times 5 \times 7$ $674 = 2 \times 337$ $\therefore H.C.F (280,674) = 2$
55.	3	Since $L.C.M(a,b) = \dfrac{a \times b}{H.C.F (a,b)} = \dfrac{1800}{12} = 150$
56.	3	Since power of x in $x + \dfrac{1}{x}$ is -1. Therefore, it is not a polynomial.
57.	3	$p(-1) = 3(-1)^4 - 5(-1)^3 + (-1)^2 + 8 = 17$
58.	3	3, because it is the highest power of variable in the polynomial $y^3 - 2y^2 - \sqrt{3}y + \dfrac{1}{2}$
59.	2	$x^2 - (sum\ of\ the\ zeroes)x + (product\ of\ the\ zeroes) = x^2 - 2x - 15$
60.	1	$\alpha + \beta = -\dfrac{2}{k}, \alpha\beta = \dfrac{3k}{k} = 3$ Since, $\alpha + \beta = \alpha\beta \Rightarrow -\dfrac{2}{k} = 3 \Rightarrow k = -\dfrac{2}{3}$
61.	2	For $x = 2, y = 1$, $x + ky = 5 \Rightarrow 2 + k = 5 \Rightarrow k = 3$
62.	1	The pair of linear equations $2kx + 5y = 7, 6x - 5y = 11$ has a unique solution if $\dfrac{a_1}{a_2} \neq \dfrac{b_1}{b_2} \Rightarrow \dfrac{2k}{6} \neq \dfrac{5}{-5} \Rightarrow k \neq 3$
63.	2	The pair of linear equations $2x + 5y = k$ and $kx + 15y = 18$ has infinitely many solutions if $\dfrac{a_1}{a_2} = \dfrac{b_1}{b_2} = \dfrac{c_1}{c_2} \Rightarrow \dfrac{2}{k} = \dfrac{5}{15} = -\dfrac{k}{-18} \Rightarrow k = 6$
64.	1	As $\dfrac{a_1}{a_2} \neq \dfrac{b_1}{b_2}$, pair of equations has unique solution
65.	4	Given lines are parallel
66.	1	Here, $a = 6, b = 7, c = -10$ $\therefore D = b^2 - 4ac = 289 > 0$ $x = \dfrac{-b \pm \sqrt{D}}{2a} \Rightarrow x = \dfrac{5}{6}$ or -2
67.	2	$k^2 + 4k + 3 = 0 \Rightarrow k = -1, -3$
68.	3	$64x^2 - 1 = 0 \Rightarrow x = \pm\dfrac{1}{8}$
69.	1	$D = b^2 - 4ac = (-4)^2 - 4(3)(-2) = 40$
70.	2	Since roots are real and distinct so, $D > 0 \Rightarrow (4)^2 - 4(1)(-k) > 0 \Rightarrow 4(4 + k) > 0 \Rightarrow k > -4$
71.	2	Explanation: a = 10, d = 10 a_1 = a = 10 $a_2 = a_1 + d = 10 + 10 = 20$ $a_3 = a_2 + d = 20 + 10 = 30$ $a_4 = a_3 + d = 30 + 10 = 40$
72.	3	First term, a = 3 Common difference, d = Second term – First term $\Rightarrow 1 - 3 = -2$ $\Rightarrow$ d = -2
73.	3	$a_2 = 13$ and $a_4 = 3$

		The nth term of an AP;
		$a_n = a+(n-1)\,d$
		$a_2 = a +(2-1)d$
		$13 = a+d$…………. (i)
		$a_4 = a+(4-1)d$
		$3 = a+3d$ ……….. (ii)
		Subtracting equation (i) from (ii), we get,
		$- 10 = 2d$
		$d = - 5$
		Now put value of d in equation 1
		$13 = a+(-5)$
		$a = 18$ (first term)
		$a_3 = 18+(3-1)(-5)= 18+2(-5) = 18-10 = 8$ (third term).
74.	**2**	First term = -3 and second term = 4
		$a = -3$
		$d = 4-a = 4-(-3) = 7$
		$a_{21}=a+(21-1)d=-3+(20)7=-3+140=137$
75.	**1**	Given AP: 5, 8, 11, 14,
		First term = a = 5
		Common difference = d = 8 – 5 = 3
		nth term of an AP = a_n = a + (n – 1)d
		Now, 10th term = a_{10} = a + (10 – 1)d= 5 + 9(3)= 5 + 27= 32
76.	**1**	Perimeter of triangle = sum of all its sides
		P = 30+40+x
		100=70+x
		x=30 cm
77.	**1**	The height of the equilateral triangle ABC divides the base into two equal parts at point D.
		Therefore,
		BD=DC= 2.5 cm
		In triangle ABD, using Pythagoras theorem,
		$AB^2=AD^2+BD^2$
		$5^2=AD^2+2.5^2$
		$AD^2 = 25-6.25$
		$AD^2=18.75$
		AD=4.33 cm
78.	**4**	: Let ABC and DEF are two similar triangles, such that,
		$\triangle ABC \sim \triangle DEF$

		And AB/DE = AC/DF = BC/EF = 4/9
		As the ratio of the areas of these triangles will be equal to the square of the ratio of the corresponding sides,
		$\therefore$ Area($\triangle$ABC)/Area($\triangle$DEF) = AB^2/DE^2
		$\therefore$ Area($\triangle$ABC)/Area($\triangle$DEF) = (4/9)^2 = 16/81 = 16: 81
79.	**1**	By distance formula, we know:
		$\sqrt{(-1-2)^2 + (x+2)^2} = 5 \Rightarrow 9 + (x+2)^2 = 25 \Rightarrow (x+2)^2 = 16$
		Take square root on both the sides,
		2 + x = 4
		x = 2
80.	**3**	As per midpoint formula, we know;
		x-coordinate of the midpoint = [2 + (-2)]/2 = 0/2 = 0
		y-coordinate of the midpoint = [4 + (-4)]/2=0/2=0
		Hence, (0, 0) is the midpoint of AB.
81.	**2**	The distance of a point from the x-axis is equal to the ordinate of the point.
82.	**2**	AB = 24 cm and BC = 7 cm
		tan C = Opposite side/Adjacent side
		tan C = 24/7
83.	**3**	sin 30° = ½, sin 60° = √3/2, cos 30° = √3/2 and cos 60° = ½
		Putting these values, we get:
		(½+½)-(√3/2+√3/2)
		= 1 − [(2√3)/2]
		= 1 − √3
84.	**3**	By trigonometry identities, we know:
		$1 + \tan^2 X = \sec^2 X$
		And sec X = 1/cos X = 1/(⅔) = 3/2
		Hence,
		$1 + \tan^2 X = (3/2)^2 = 9/4$
		$\tan^2 X = (9/4) − 1 = 5/4$
		tan X = √5/2
85.	**1**	tan 30° = 1/√3
		Putting this value we get;
		[2(1/√3)]/[1 + (1/√3)^2] = (2/√3)/(4/3) = 6/4√3 = √3/2 = sin 60°
86.	**2**	sin 45° + cos 45° = (1/√2) + (1/√2)
		= (1 + 1)/√2
		= 2/√2
		= (√2 . √2)/√2
		= √2
87.	**3**	We know, for an angle of elevation θ,

		tan θ = Height of building/Distance from the point
		If we increase both the value of the angle of elevation remains unchanged.
88.	**1**	We know: tan (angle of elevation) = height of tower/its distance from the point tan 60° = h/15 √3 = h/15 h = 15√3
89.	**1**	A tangent touches the circle only on its boundary and do not cross through it.
90.	**3**	If the angle between two radii of a circle is 110º, then the angle between tangents is 180º − 110º = 70º. (By circles and tangents properties)
91.	**3**	Radius = 5cm Area = πr² = 3.14 x 5 x 5 = 78.5 sq.cm
92.	**2**	Given, Side of square = 8 cm Diameter of a circle = side of square = 8 cm Therefore, Radius of circle = 4 cm Area of circle= π(4)²= π (4)²= 16π cm²
93.	**2**	$a^3 = 2744 = 2^3 \times 7^3 \Rightarrow a = (2 \times 7) = 14cm$ $\therefore S.A = 6 \times 14^2 =1176cm^2$
94.	**4**	$\frac{total\ surface\ area}{Lateral\ surface\ area} = \frac{2\pi r(h+r)}{2\pi rh} = \frac{h+r}{h} = \frac{(20+80)}{20} = \frac{5}{1}$
95.	**2**	Let the number of spherical balls of radius 1cm be n. Total volume $= n\frac{4}{3}.\pi.1^3 = $ Volume of bigger sphere $\Rightarrow n\frac{4}{3}.\pi.1^3 = \frac{4}{3}.\pi.8^3 \Rightarrow n = 512$
96.	**3**	If we join two hemispheres of same radius along their bases, then we get a Sphere.
97.	**1**	If r is the radius of the sphere, then the surface area of the sphere is given by $4\pi r^2$
98.	**2**	mean$= \frac{7+7+5+7+x}{5} = \frac{26+x}{5}$ Here mode$= 7$ It is given that, mean=mode=median $\Rightarrow \frac{26+x}{5} = 7 \Rightarrow 26 + x = 35 \Rightarrow x = 9$
99.	**2**	If $E_1, E_2, ..., E_n$ are elementary events, then $p(E_1) + p(E_2) + \cdots + p(E_n) = 1$
100.	**2**	The probability lies between 0 and 1. Hence, it cannot be negative.