CHEMISTRY

1. The total number of electrons that take part in forming the bond in O_2 is;

   (a) 2

   (b) 6

   (c) 8

   (d) 4

2. The chemical formula for bleaching powder is;

   (a) $CaOCl_2$

   (b) $CaCl_2$

   (c) $CaOCl$

   (d) $CaOCl_3$

3. Which of the following represents the correct relation between Avogadro's number (No), number of particles (N) and moles (n)?

   (a) $n = N / No$

   (b) $n = No / N$

   (c) $n = N \, No$

   (d) All are correct

4. Identify the correct symbol of gold;

   (a) Go

   (b) Ge

   (c) Gd

   (d) Au

[3]

5. An element X has valency equal to 3. What will be its formula with carbonate ions?

(a) X_2CO_3

(b) XCO_3

(c) $X_2(CO_3)^3$

(d) $X(CO_3)_3$

6. The formula for Calcium phosphate is:

(a) $CaPO_4$

(b) $Ca(PO_4)_2$
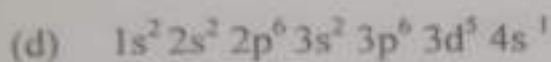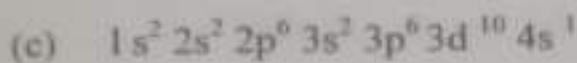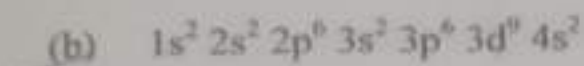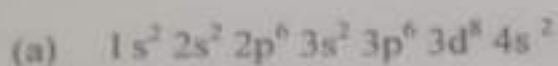
(c) $Ca_3(PO_4)_2$

(d) $Ca_2(PO_4)_3$

7. A solution turns red litmus blue; its pH value is likely to be;

(a) 1

(b) 4

(c) 5

(d) 10

8. The pair of ions having same electronic configuration is:

(a) Cr3+, Fe3+

(b) Fe3+, Mn2+

(c) Fe3+, Co3+

(d) Sc3+, Cr3+

9. Which of the following options does not represent ground state electronic configuration of an atom?

(a) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^8 4s^2$

(b) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^9 4s^2$

(c) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^1$

(d) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^5 4s^1$
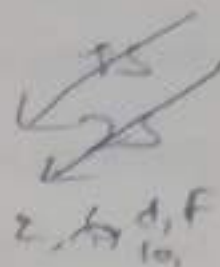
10. Which of the following statements about the electron is incorrect?

(a) It is a negatively charged particle.

(b) The mass of electron is equal to the mass of neutron.

(c) It is a basic constituent of all atoms.

(d) It is a constituent of cathode rays.

11. An atom of an element has the electronic configuration 2, 8, 2. To which group does it belong?

(a) 4th group

(b) 6th group

(c) 3rd group

(d) 2nd group

12. The arrangement of elements in the Modem Periodic Table is based on their:

    (a) Increasing atomic mass in the period

    (b) Increasing atomic number in the horizontal rows

    (c) Increasing atomic number in the vertical columns

    (d) Increasing atomic mass in the group

13. Where would you locate the element with electronic configuration 2, 8 in the Modern Periodic Table?

    (a) Group 8   (b) Group 2

    (c) Group 18   (d) Group 10

14. Element 'X' forms a chloride with the formula XCl_2, which is a solid with high melting point. X would most likely be in the same group of the periodic table as;

    (a) Si   (b) Mg

    (c) Al   (d) Na

15. Carbon belongs to the second period and Group 14. Silicon belongs to the third period and Group 14. If atomic number of carbon is 6, the atomic number of silicon is;

(a) 7

(b) 14

(c) 24

(d) 16

[handwritten notes in right margin: H; He; Li be; b,c,N; n F, He Naing, Al, Si]

16. What is the atomic number of element of period 3 and group 17 of the Periodic Table?

(a) 10

(b) 4

(c) 17

(d) 21

17. Which one of the following statements is not correct about the trends in the properties of the elements of a period on going from left to right?

(a) The oxides become more acidic

(b) The elements become less metallic

(c) There is an increase in the number of valence electrons

(d) The atoms lose their electrons more easily

18 Which of the following set of elements is written in order of their increasing metallic character?

(a) Na Li K

(b) C Q N

(c) Mg Al Si

(d) Be Mg Ca

19 A metal 'M' is in the first group of the Periodic Table. What will be the formula of its oxide?

(a) MO

(b) M_2O

(c) M_2O_3

(d) MO_2

20. Electrovalent compounds are;

(a) Low melting

(b) Insoluble in polar solvents

(c) Conductors in the fused state (d) none of the above

21. Ionic compounds don't conduct electricity in;

(a) Solution

(b) Fused state

(c) Solid state

(d) none of the above

22. The bond between two atoms of the same element is;

    (a) Polar covalent bond   (b) Ionic bond

    (c) Non-polar covalent bond   (d) none of the above

23. An element having 4 electrons in its outermost orbit forms bond by:

    (a) Losing electrons   (b) Gaining electrons

    (c) Sharing electrons   (d) any of the above

24. The percentage of ionic character of a bond is calculated by the difference in;

    (a) Size of atoms   (b) Ionization potential of atoms

    (c) Electronegativity of atoms   (d) Atomic volumes of atoms

25. Protons play an important role in which type of bonding?

    (a) Electrovalent   (b) Hydrogen

    (c) Covalent   (d) Coordinate

26. A molecule with multiple covalent bonds is:

    (a) C_2H_4

    (b) H_2

    (c) F_2

    (d) N_2

27. Which of the following elements will form acidic oxide?

    (a) With atomic number 7

    (b) With atomic number 3

    (c) With atomic number 12

    (d) with atomic number 19

28. Which set out of them shows the correct sequence of metallic characters?

    (a) Be, Mg, Ca

    (b) Na, Li, K

    (c) Mg, Al, Si

    (d) C, O, N

29. The number of electrons in valence shell is equal to;

    (a) Atomic mass

    (b) Group number

    (c) Period number

    (d) Atomic volume

30. Which will lose electrons easily?

    (a) Mg

    (b) Na

    (c) K

    (d) Ca

31. Which of the following metal is liquid?

(a) Sodium

(b) Gold

(c) Mercury

(d) diamond

32. The atoms combine with another to form;

(a) Atoms

(b) Elements

(c) Matter

(d) Molecules

33. The number of electrons in the valence shell varies from;

(a) 0 to 8

(b) 1 to 8

(c) 1 to 6

(d) 1 to 10

34. The physical state of water at room temperature is;

(a) Liquid

(b) Solid

(c) Gaseous

(d) vapour

35. Proton was discovered by;

(a) Gold Stein

(b) Chadwick

(c) J J Thomson

(d) Rutherford

36. The outer most shell of an atom can have a maximum of;

   (a) 6

   (b) 2

   (c) 8

   (d) 18

37. The maximum number of electrons that can be accommodated in any energy level of the atom is;

   (a) $2n^2$

   (b) n^2

   (c) $2n$

   (d) $2/n^2$

38. An isotope of cobalt is used in;

   (a) Treatment of cancer

   (b) Fuel in nuclear reactor

   (c) Treating goiter

   (d) All of the above

39. All inert gas elements have eight electrons in their outmost shell except;

   (a) Neon

   (b) Argon

   (c) Helium

   (d) Krypton

40 Water decomposes into hydrogen and oxygen by;

(a) Thermal decomposition   (b) Electrolysis

(c) Photolysis   (d) None of the above

41. Oxidation reaction involves:

(a) Loss of electrons   (b) Addition of oxygen

(c) Removal of hydrogen   (d) All of the above

42. Which of the following has the highest density?

(a) Water   (b) Iron

(c) Air   (d) Honey

43. 66°C is equal to;

(a) 339 K   (b) 207 K

(c) 543 K   (d) 311 K

273
66
339

44. The process where a liquid changes to gas:

    (a) Freezing

    (b) Vaporization

    (c) Fusion

    (d) Condensation

45. Absolute alcohol is:

    (a) 100% methanol

    (b) 100% ethanol

    (c) 5%+95% methanol

    (d) 5%+95% ethanol

46. The most reactive elements;

    (a) Na

    (b) K

    (c) Ca

    (d) Mg

47. The highest melting point is of;

    (a) Cao

    (b) $MgCl_2$

    (c) NaCl

    (d) $CaCl_2$

48. Which of the following methods is suitable for preventing an iron frying pan from rusting?

(a) Applying pain

(b) Applying grease

(c) Applying coating zinc

(d) All of the above

49. An element reacts with oxygen to give a compound with melting point and it is also soluble in water. The element is;

(a) Calcium

(b) Carbon

(c) Silicon

(d) Iron

50. Food cans are coated with tin and not with zinc because;

(a) Zinc is more costly than tin

(b) Zinc has high melting point that tin.

(c) Zinc is more reactive than tin

(d) Zinc is less reactive than tin

51. The highest boiling point (K) of the compound of carbon;

(a) Chloroform ($CHCl_2$)

(b) Methane (CH_4)

(c) Acetic acid (CH_3COOH)

(d) Ethanol (CH_3CH_3OH)

52. The formula for Butane;

(a) C_2H_6

(b) C_4H_{10}

(c) C_3H_8

(d) C_5H_{12}

53. The mass of 0.5 mole of N_2 gas;

(a) 14 g

(b) 15g

(c) 12 g

(d) 16 g

54. Isotopes of an element have;

(a) The same physical properties

(b) Different chemical properties

(c) Different number of neutrons

(d) Different atomic numbers

55. Number of valence electrons in Cl⁻ ion are :

(a) 16

(b) 8

(c) 17

(d) 18

56. Which one of the following is a correct configuration of sodium?

(a) 2, 8

(b) 8, 2, 1

(c) 2, 1, 8

(d) 2, 8, 1

57. An Isotope of Iodine is used in;

(a) Treatment of goiter

(b) Treatment of cancer

(c) Nuclear reactor as fuel

(d) All of the above

58. Isobars are:

(a) Calcium, Argon

(b) Calcium, Carbon

(c) Protium, Tritium

(d) Carbon, chlorine

59. The electrons distribution of Aluminium in different shells:

(b) 2, 8, 0

(a) 2, 8, 3

(d) 2, 8, 4

(c) 2, 8, 5

60. The number of valency in Belium:

(a) 1

(b) 0

(c) 2

(d) 3

61. The chemical formula for copper nitrate:

(a) $Cu(NO_3)_2$

(b) $Cu(NO_2)_3$

(c) $Cu\,NO_3$

(d) $Cu(NO_3)_3$

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62. Which of the following is not mixture?

(a) Sea Water

(b) Pure water

(c) Air

(d) Brass

63. S.I. unit of pressure is:

(a) Cubic Meter

(b) Kilogram

(c) Pascal

(d) Kilogram per Cubic Meter

64. Metals are the elements that;

(a) Lose electrons

(b) Gain Electrons

(c) Share electrons

(d) none of the above

65. Which of the following contains maximum number of molecules?

(a) $19 CO_2$

(b) $1 g N_2$

(c) $1 g H_2$

(d) $1 g CH$

66. Which of the following represents a correct chemical formula?

(a) $CaCl$

(b) $BiPO_4$

(c) $NaSO_4$

(d) NaS

67. If $\tan 2A = \cot(A-24°)$, then A is:

(a) $12°$

(b) $24°$

(c) $36°$

(d) $38°$

68. The total surface are of hemisphere of radius 7cm is:

(a) 462 cm^2

(b) 154 cm^2

(c) 308 cm^2

(d) 46.34 m^2

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69. In a circle of radius 7, the angle of sector is $60°$. Then the area of sector is:

(a) 27.6 cm^2

(b) 110 cm^2

(c) 36.6 cm^2

(d) 55 cm^2

70. In an A.P. if $d= -4$, $n=7$, $a_n=4$, then a is:

(a) 7

(b) 28

(c) 20

(d) 6

[20]

71. For the quadratic equation $2x^2-4x+3=0$, the roots are

(a) Real and equal

(b) Real and distinct

(c) Can't be said

(d) not real

$$\frac{16 \pm \sqrt{-4 - 4\times2\times3}}{4}$$

$\Rightarrow 16 + \cdots$

72. The arithmetic progression:

- $1/a$, $(3-a)/3a$, $(3-2a)/3a$ .... $(a \neq 0)$

The common difference is;

$a_n = \frac{1}{a} + (a_n-1)$

$\frac{3-a}{3a} - \frac{1}{a}$

(a) 1

(b) -1

$\Rightarrow \frac{3a-a-3a}{(3a)a}$

(c) -1/3

(d) 3

$\Rightarrow \frac{-a}{3a^2}$

$\frac{1}{a} + (n-1)\frac{-a}{3a^2} =$

73. The circumference of a circle of radius 7.7 cm is

$\frac{3-a}{3a} - \frac{1}{a} = \frac{3-2a}{3a}$

(a) 48.4 cm

(b) 4 44 m

(c) 44.4 cm

(d) 48.4 m

$2 \times \frac{22}{7} \times \frac{7.7}{10}$ = 48.4

$\frac{3-a}{3a} - \frac{1}{a} = \frac{3-2a}{3a} - \frac{(3-a)}{3a}$

$\Rightarrow \frac{3a-a^2-3a}{3a^2} = \frac{3-2a-3+a}{39}$

$\Rightarrow \frac{-a^2}{3a^2} = \frac{-a}{3a}$

$\Rightarrow -3a^3 = -3a^3$

Entrance Examination - 2021 - 22

74. The lower limit of modal class of the following data is:

Marks Obtained	0-20	20-40	40-60	60-80	80-100
Number of student	8	10	12	7	4

(a) 20

(b) 40

(c) 60

(d) 100

75. The value of $(1 + \cot^2 2\theta) \sin^2 2\theta$ is:

(a) 2

(b) 0

(c) -1

(d) 1

76. A solid sphere of radius 2r is melted and cast into the sphere of a solid cone of height r, and then the radius of the base of a cone is:

(a) $(\sqrt{2}) r$

(b) $(\sqrt{2} r)$

(c) $4((\sqrt{2}) r$

(d) $4(\sqrt{2} r)$

$$\frac{1}{\cos A} = \frac{1}{\sin B}$$

77. If $\sec A = \csc B$, then $A+B$ is;

(a) $90°$

(b) $45°$

(c) $60°$

(d) $180°$

78. The value of $\tan 48°. \tan 13°. \tan 42°. \tan 77°$ is;

(a) -1

(b) 1

$$\frac{\tan 48 \cdot (\tan}{\cot 48}$$

(c) 0.5

(d) '12

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79. If the distance between the points $A (O, O)$ and $B(x,-5)$ is 5 units, then the

value of x

$(0,0)$ $\qquad$ $(x,-5)$

(a) $(-1, 1)$

(b) $(-2, 2)$

$$x^2 + 5^2 - 5 = 5$$
$$x = 5 - 2^x$$

(c) $(4, -4)$

(d) $(3,-3)$

$$\sqrt{(0-x)^2 + (0+5)^2} = 5$$
$$x^2 + 25 = 25 = 0$$

80. For what value of k, -4 is a zero of the polynomial $x^2-x-(3k+2)$;

(a) 5

(b) 6

$$(x-0)^2 + (-5-0)^2 = 25$$

(c) 4

(d) 3

$$(x-0)^2 + (-5-0)^2 = 25$$
$$x^2 + 25 = 25$$
$$x^2 = 0 - 20$$
$$x^2 = \sqrt{-20}$$

$$\alpha + \beta = \frac{-b}{a}$$
$$\alpha \cdot \beta = \frac{c}{a}$$

DM SET – A

$$-4 = \frac{}{3k+2} = -16$$
$$k = -$$

81. Points A (3, 1), B (5, 1), C (x, y), and D (4, 3) are the vertices of a parallelogram ABCD, then the values of x and y;

(a) (6, 3)

(b) (2, 6)

(c) (6, 4)

(d) (2, 4)

$(5-3)^2 + (1-1)^2 = (4-x)^2 + (3-y)^2$

$\Rightarrow 4 = 16 + x^2 - 8x + 9 + y^2 - 6y$

$\Rightarrow x^2 - 6y^2 - 8x - 6y = -21$

82. A die is thrown once; the probability of getting the composite number is;

(a) 1/2

(b) 1/4

(c) 1/6

(d) 1/3

83. If tan (A+B) = 1 and tan (A-B) = 1 √3, 0°< A+B>90°, A>B, then the values of A and B are;

(a) A=36.5, B=8.5

(b) A=42.5, B=9.5

(c) A=37.5, B=7.5

(d) A=34.5, B=6.5

84. If sin x + cos y= 1; x=30° and y is an acute angle, find the value of y;

(a) 60°

(b) 70°

(c) 65°

(d) 50°

$\frac{1}{2} + x = 1$

$x = 1 - \frac{1}{2}$

$\Rightarrow \frac{1}{2}$

Entrance Examination – 2021 - 22

85. The probability of face cad of spade from a pack of cards is;

(a) 2/52

(b) 1152

(c) 5/52

(d) 3/52

86. If in an A.P., a= 15, d=-3, and an=O, then n is;

(a) 4

(b) 6

(c) 5

(d) 2

$$15+(n-1)-3=0$$
$$15-3n+3=0$$
$$15-3n=-18$$
$$-3n=$$

87. The point (3, a) lies on the line represented by 2x-3y=5 for the value of 'a';

(a) 1/3

(b) 1/2

(c) 1/5

(d) 1/7

$$6-3y=5$$
$$-3y=1$$

88. The missing term in the following A.P. is; 2, ---, 22

(a) 10

(b) 6

(c) 12

(d) 8

$$2+(n-1)d=22$$
$$(n-1)d=20$$

89. A wire in shape of a square of side 88cm, is bent so as to form a circular ring, the radius of the circle is:

(a) 46

(b) 56

(c) 96

(d) 36

90. If $\tan 8 = 1N3$, the value of $\sin(90° - 8)$ is:

(a) 0

(b) 1

(c) $\sqrt{3}$

(d) $\sqrt{3}\sqrt{2}$

91. The ratio of the areas of a circle and an equilateral triangle whose diameter and a side are respectively equal is:

(a) $4\pi\sqrt{3}$

(b) $\pi/(\sqrt{3}\,a)$

(c) $\pi/\sqrt{3}$

(d) $2\pi/\sqrt{3}$

Entrance Examination – 2021 - 22

92. The mode of the following distribution is:

Weight (in Kg)	35	40	45	50	55	60
Number of children	6	10	22	15	9	8

(a) 22

(b) 55

(c) 8

(d) 45

93. The pair of equation $x=2$ and $y+7=0$ has; $-\frac{b}{a}= \frac{x}{4}\left|\frac{2}{a}\right.$

(a) One solution

(b) Two solution

(c) Infinite many solutions

(d) No solution

94. The zeroes of the quadratic polynomial $x^2-88x+125=0$ are

(a) Both negative

(b) One positive and one negative

(c) Both positive

(d) Both equal

95. It is given that $\triangle ABC \sim \triangle DEF$ and the corresponding sides of these triangles are in the ratio 5:9, then ar $(\triangle ABC)$: ar $(\triangle DEF)$ = ?

(a) 9:5

(b) 25:81

(d) 81:25

(c) 5:9

96. The measure of three angles of a triangle are in the ratio 1:2:3, then the triangle is;

(a) Equilateral

(b) Isosceles

(e) Right angled

(d) Obtuse angled

97. The mid-point of the line segment joining the point A (6, 10) to B (4, 6) is;

(a) (5, 8)

(b) (8, 5)

(c) (7, 6)

(d) (6, 4)

98. If the area of the circle is numerically equal to twice its circumstances, then the diameter of the circle is;

(a) 4

(b) 10

(c) 6

(d) 8

DOI SET – A

[28]

Entrance Examination – 2021–22

99. In a statistical data, the difference between mode and mean is k times the difference between median and mean then the value of k is:

(a) 4

(b) 3

(c) 2

(d) 6

100. If the product of the roots of the equation $x^2 - 9x + k = 10$ is 5, then the value of k is;

$k \cdot R = \frac{c}{a}$

(a) 15

(b) 5

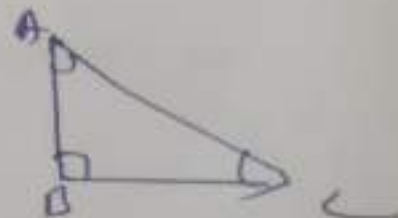$\frac{k}{1} = 10$

(c) 10

(e) 4

101. If $\triangle ABC$ is right angled at B, then $\sin (A+C)$ is;

(a) 0

(b) $1/\sqrt{2}$

(c) 1

(d) $1/\sqrt{3}$

$\sin 90$

102. If in right angled $\triangle ABC$ tan B = 12/5, then sin B is:

(a) 5/12

(b) 4/5

(c) 12/5

(d) 12/13

Handwritten:
$$\frac{\sin B}{\cos B} = \tan B$$
$$\sin B = \frac{12 \cdot}{c}$$
$$\frac{\sin B}{\sin(90-B)}$$

103. A number N when divided by 14 gives the remainder 5. When the same number is divided by 7, then the remainder is;

(a) 7

(b) 5

(c) 0

(d) 4

Handwritten:
$$H = 14 \times a + 5$$
$$N = 14a + 5$$
$$H = 7a + 2$$
$$7(33) \Rightarrow 14a + 5 = 7a +$$
$$14a + 5 = 14a+$$
$$7a + 2 = 14a + 5$$
$$2 = 7a + 5$$
$$14a + 5 = 7a + 14$$

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104. The area of a circle whose circumference is 44 cm is;

(a) 144 cm²

(b) 49 cm²

(c) 154 cm²

(d) 174 cm²

Handwritten:
$$2\pi r = 44$$
$$r = 22$$
$$\pi r^2$$
$$\frac{22}{7} \times$$

105. The distance between the points (7, 4) and (-1, 8) is;

(a) 5 units

(b) 4√5 units

(c) 5√2 units

(d) 20 units

Handwritten:
$$(-1-7)^2 + (8-4)^2$$
$$64 + 16$$
$$\sqrt{80}$$

D01 SET – A
[30]

Entrance Examination – 2021 -22

106. The 9th term from the end of the A.P. 5, 9, 13,........ 185 is:

(a) 153

(b) 37

(c) 185

(d) 217

$185 + 68 \times 4$
$\Rightarrow 185 + 32$
$\Rightarrow 217$

107. The value of p for which the polynomial $x^3+4x^2-px+8=0$ is exactly divisible by (x-2):

(a) 6

(b) 12

(c) 14

(d) 16

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108. A circle has a number of tangents equal to:

(a) 0

(b) 1

(c) 2

(d) Infinite

109. If a parallelogram circumscribes a circle, then it is a:

(a) Square

(b) Rectangle

(c) Rhombus

(d) None of the above

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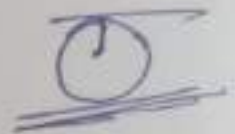
(a) 90°

(b) 50°

(c) 70°

(d) 40°

111. The distance between two parallel tangents of a circle of radius 4 cm is:

(a) 2

(b) 4

(c) 6

(d) 8

112. The longest chord of the circle is:

(a) Radius
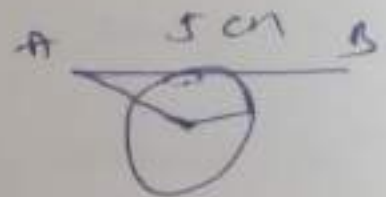
(b) Arc

(c) Diameter

(d) Segment

113. The length of a tangent from a point A at a distance 5 cm from the centre of the circle is 4 cm. The radius of the circle is:

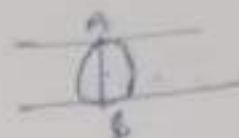(a) 3cm

(b) 5cm

(c) 7cm

(d) 10cm

114. Two parallel Lines touch the circle at points A and B respectively. If area of the circle is 25n cm2, then AB is equal to;

(a) 5 cm

(b) 8 cm

(c) 10 cm

(d) 25 cm

$\pi r^2 = 25$

$r = 5$

115. In figure AT is a tangent to the circle with centre O such that OT = 4 cm and ∠OTA = 30° The AT is equals to:
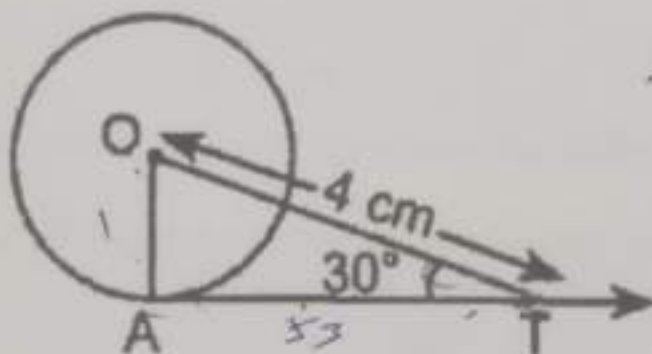
$\tan 30 = \frac{1}{\sqrt{3}}$

$3 + 1 = 16$

(a) 2√3 cm

(b) 4 cm

*(c) 4√3 cm

(d) 2 cm

116. If x and y are complementary angles, then

(a) sin x = sin y

(b) tan x = tan y

(c) cos x = cos y

(d) sec x = cosec y

117. $\sin 2B = 2 \sin B$ is true when B is equal to;

(a) 90°

(b) 0°

(c) 30°

(d) 60°

118. If A and $(2A - 45°)$ are acute angles such that $\sin A = \cos (2A - 45°)$, then tan A is equal to;

(a) 0

(b) $1\sqrt{3}$

(c) 1

(d) $\sqrt{3}$

119. If $\sin \theta + \sin^2 \theta = 1$, then $\cos^2 \theta + \cos 4 \theta$ is;

(a) -1

(b) 0

(c) 1

(d) 2

120. The minimum value of $\sin A$, $0 \leq A \leq 90°$;

(a) -1

(b) 0

(c) 1

(d) 12

121. If cos 9A = sin A and 9A < 90°, then the value of tan 5A is;

(a)   1

(b)   0

(c)   1√3

(d)   √3

122. The surface area of cuboid-shaped box having length=80 cm, breadth=40cm

and height=20cm is;

(a)   13000 cm²

(b)   13400 cm²

(c)   12000 cm²

(d)   11200 cm²

123. The Curved surface area of a right circular cylinder is 4.4 cm². The radius

of the base is 0.7 cm. The height of the cylinder will be;

(a)   2

(b)   3

(c)   4

(d)   6

124. The diameter of the base of a cone is 10.5 cm, and its slant height is 10 cm.

The curved surface area is;

(a)   150 cm²

(b)   177 cm²

(c)   165 cm²

(d)   180 cm²

125. A cuboid having surface areas of 3 adjacent faces as a, b and c has the volume:

(a) $3\sqrt{abc}$

(b) $\sqrt{abc}$

(c) abc

(d) $(abc)^2$

126. The radius of a cylinder is doubled and the height remains the same. The ratio between the volumes of the new cylinder and the original cylinder is:

(a) 1:2

(b) 3:1

(c) 1:8

(d) 4:1

127. The centroid of a triangle ABC, A (-2, 3), B (2,-1), C (4, 0) is:

(a) (2/3, 1/3)

(b) (1/3, 2/3)

(c) (4/3, 2/3)

(d) (-4/3, 2/3)

$\dfrac{9+2}{3}$

128. The Arithmetic mean of 1,2,3,4 ....n , is:

(a) n/2

(b) (n/2) + 1

(c) (n-1)/2

(d) (n+ 1)/2

129. If sin A= 1/2 and cos B= 1, the value of (A+B); 30,

(a) 30°

(b) 45°

(c) 60°

(d) 75°

130. If AB=BC= a units and AC= (√2) a units of the sides of triangle ABC, then

∠B is;

(a) 45°

(b) 30°

(c) 60°

(d) 90°

131. If x= a cosecθ, y=a cotθ, then x^2-y^2 is equal to;

(a) 1

(b) $-a^2$

(c) a^2

(d) -1

132. If sin θ = (√3)/2, then the value of cot θ is; $\frac{\sqrt{3}}{2}$, 60,

(a) 2

(b) 1/√3

(c) √3

(d) 1√2

133. The roots of the quadratic equation $x^2 - 7x + 12 = 0$

(a) $-4, 3$

(b) $4, 3$

(c) $4, 3$

(d) $-4, 3$

PHYSICS

134. A particle is moving in a circular path of radius r. The displacement after half a circle would be;

    (a) Zero   (b) πr

    (c) 2r   (d) 2πr

135. If the displacement of an object is propoltional to square of time, then the object moves with

    (a) Uniform velocity   (b) Uniform acceleration

    (c) Increasing Acceleration   (d) Decreasing acceleration

136. from the given v-t graph, it can be inferred that the object is;
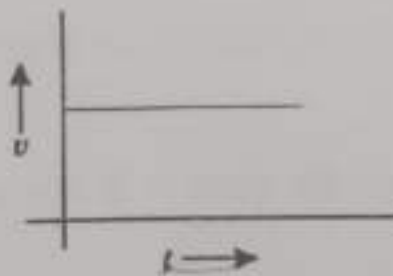
    (a) In uniform motion

    (b) At rest

    (c) In non-uniform motion

    (d) Moving with uniform acceleration

[39]

137. Slope of a velocity-time graph gives:

(a) The distance

(b) The displacement

(c) The acceleration

(d) The speed

138. In which of the following cases of motions, the distance moved and the magnitude of displacement are equal?

(a) If the car is moving on a straight road

(b) If the car is moving in Circular path

(c) The pendulum is moving to and fro

(d) The earth is revolving around the sun

139. What is the net force on the particle if it is simultaneously acted upon by two forces 4 N and 3 N?

(a) 1 N

(b) 7 N

(c) 21 N

(d) Between 7 N and 1 N

140. If the magnitude of the resultant force of two forces is lesser than the magnitude of the larger force, then

(a) The two forces are perpendicular to each other

(b) They two forces in opposite directions

(c) The forces are different i n magnitude and direction

(d) The forces possess small magnitude

141. Two forces F1 →and F2→that are perpendicular to each other act on a point mass. The resultant force in the point mass is given by

(a) F1+F2

(b) F1-F2

(c) Fl^2+F2^2

(d) $\sqrt{(F12+F22)}$

142. Which of the following is true for the given diagram?
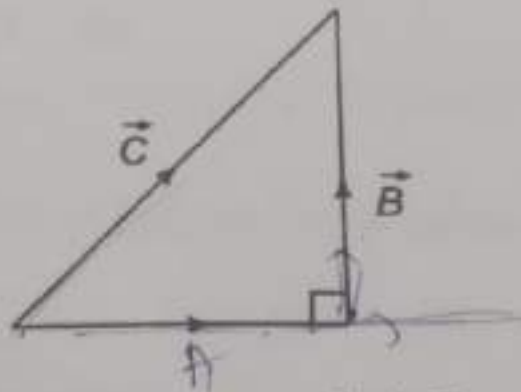
(a) $\vec{A}+\vec{B}=\vec{C}$

(b) $\vec{C}+\vec{A}=\vec{B}$

(c) $\vec{B}+\vec{C}=\vec{A}$

(d) $\vec{A}+\vec{B}+\vec{C}=0$

143. If three vectors A, B and C have magnitudes 5, 12 and 13 and $A + B = C$, then what is the angle between B and C?

(a) $\cos^{-1} 12/13$

(b) $\cos^{-1} 13/12$

(c) $\cos^{-1} 5/7$

(d) $\cos^{-1} 7/5$

144. A person travels 10 km North and 20 km east. What will be the displacement from the initial point?

(a) 20 km

(b) 22.36 km

(c) 30 km

(d) 32.36 km

145. The energy loss in a perfectly inelastic collision if the mass of the object is 40kg with velocity 4m/s hits the object of mass 60kg with velocity 2m/s.

(a) 440J

(b) 110J

(c) 392J

(d) 48J

146. What is the average power required to lift a mass of 100kg to a height of 50m in 50 seconds?

(a) 980

(b) 100

(c) 50

(d) 5000

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147. What is the power of the engine when the velocity of the car is v, mass m, acceleration a, and external resistance R;

(a) (R-m a) v

(b) (R+m a) v

(c) m a v

(d) R v

148. When can one say that work is done on the body?

(a) When the body experiences force

(b) When there is an increase in energy because of mechanical influence

(c) When the body moves a certain distance

(d) None of the above

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New Delhi

149. What is the average power required to lift a mass of 100kg to a height of 50m in 50 seconds?

(a) 980

(b) 100

$P = \dfrac{w}{t} = \dfrac{f}{t}$

(c) 50

(d) 5000

$\dfrac{5000}{50}$

[43]

150. The final kinetic energy of a block of mass if the mass of the block is 10kg and has a constant velocity of 10m/s. The block of mass is subjected to a retarding force of F=0.1J/m;

(a) 275J

(b) 250J

(c) 475J

(d) 450J

151. By how much does kinetic energy increase if the momentum is increased by 20%;

(a) 55%

(b) 66%

(c) 44%

(d) 77%

152 A force F acts between two charges +Q and -Q that is placed at a certain distance from each other. The third sphere of charge Q is placed between them. What is the magnitude and force experienced by the third charge?

(a) 3F in the direction of +Q charge

(b) 8F in the direction of -Q charge

(c) 4F in the direction of +Q charge

(d) No direction and magnitude is zero

153. At a distance r, two equal charges are kept and they exert a force F on each other. What is the force acting on each charge, if the distance between them is doubled and charges are halved?

(a) F/4

(b) 4 F

(c) F/8

(d) F/16

[Handwritten: $\frac{q_1 q}{r^2}$, $2 \times \frac{(\frac{1}{2})^2}{4}$, $\frac{1}{4}$, $\frac{}{4}$]

154. Determine the total electric flux of a unit positive charge which is kept in the air?

(a) $4\pi\varepsilon_0^{-1}$

(b) ε_0^{-1}

(c) ε_0

(d) $4\pi\varepsilon_0$

155. What is the SI unit of permittivity of free space?

(a) Weber

(b) Farad

(c) $C^2 N^{-1} m^{-2}$

(d) $C^2 N^{-1} m^2$

156. A light and a heavy body have equal momenta. Which one has greater kinetic energy?

[Handwritten: (mv)]

(a) The light body

(b) The heavy body

(c) The kinetic energy is equal

(d) Data is incomplete

157. If the momentum of a body is increased n times, its kinetic energy increase:

(a) n times

(b) 2n times

(c) n³ times

(d) n² times $\frac{1}{2}-n$

158. When work is done on a body by an external force, it is;

(a) Kinetic Energy Increases

(b) Potential energy increases

(c) Both kinetic energy and potential energy increases

(d) Sum of the kinetic energy and potential energy remains constant

159. If the K.E of a body is increased by 300% its momentum will increase by

(a) 100%

(b) 150%

(c) 200%

(d) 175% $\frac{1}{2}mv^2$

$3\frac{1}{2}mv^2 = \frac{3v^2}{mv^2}$

160. A fan is making 600 revolutions per minute. If after some time it makes 1200 revolutions per minute, then increase in its angular velocity

(a) 10 π rad /sec

(b) 20 π rad /sec

(c) 40 π rad /sec

(d) 60 π rad /sec

$60 - 600$
$1 - 10$

$60 - 1200$

161. The heating element of an electric iron is made up of:

(a) Copper   (b) Nichrome

(c) Aluminium   (d) Iron

162. The electrical resistance of insulators is:

(a) High   (b) Low

(c) Zero   (d) Infinitely High

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163. Electrical resistivity of any given metallic wire depends upon;

(a) Its thickness   (b) Its shape

(c) Nature of the material   (d) Its length

164. Electric power is inversely proportional to;

(a) Resistance   (b) Voltage

(c) Current   (d) Temperature

165. What is the commercial unit of electrical energy?

(a) Joules

(b) Kilojoules

(c) Kilowatt-hour

(d) Watt-hour

166. Three resistors of 1Ω, 2Ω and 3Ω are connected in parallel. The combined resistance of the three resistors should be;

$$\frac{1}{1} + \frac{1}{2} + \frac{1}{3}$$

(a) Greater than 3Ω

(b) Less than 1Ω $\frac{6+3+2}{6} = \frac{11}{6}$

(c) Equal to 2Ω

(d) Between 1Ω and 3Ω

167. An electric bulb is connected to a 220V generator. The current is 0.50 A. What is the power of the bulb?

$220 \times \frac{1}{100} \times 50 = 2$

(a) 440 W

(b) 110 w

(c) 55 w

(d) 0.0023 w

168. The resistivity of insulators is of the order of;

(a) 10-80-m

(b) 1010-m

(c) 10-60-m

(d) 1060-m

169. 1 kWh = ...J:

(a) 3.6 × 10-6J

(b) (1/3.6) × 106J

(c) 3.6 × 106J

(d) (1/3.6) × 10-6J

170. 100 J of heat is produced each second in a 4 Ω resistor. The potential difference across the resistor will be:

(a) 30 v

(b) 10 v

(c) 20 v

(d) 25 v

171. A full length image of a distant tall building can definitely be seen by using;

(a) A concave mirror

(b) A convex mirror

(c) A plane mirror

(d) Both concave as well as plane mirror

172. The laws of reflection hold good for:

   (a) Plane mirror only

   (b) Concave mirror only

   (c) Convex mirror only

   (d) All mirrors irrespective of their shape

173. Light travel fastest in;

   (a) Water   (b) Air

   (c) Glass   (d) Diamond

174. The mirror having reflection surface curved outward;

   (a) Plane mirror   (b) Concave mirror

   (c) Convex mirror
                                        (d) cylindrical mirror

175. Unit of intensity of magnetic field is;

   (a) Tesla
                                        (b) Ohm

   (c) Ampere
                                        (d) Volt-ampere

176. An electron is moving in an uniform magnetic field perpendicularly with velocity v. The force exerts on electron will be:

(a) ev/B

(b) evB

(c) eB/v

(d) vB/e

177. Electric motor converts;

(a) Chemical energy into electric energy

(b) Electric energy into mechanical energy

(c) Mechanical energy into electric energy

(d) E energy into chemical energy.

178. If Θ =magnetic flux, B = magnetic field intensity, A = area, then the correct relationship between them is;

(a) $B = \Theta/A$

(b) $\Theta = B/A$

(c) $A = B\Theta$

(d) $B = \Theta A$

179. In A.C. generator, increasing the no. of turns in the coil;

(a) Decreases the electromotive force (EMF)

(b) Electromotive force (EMF) remains the same

(c) Increases the electromotive force (EMF)

(d) Electromotive force (EMF) becomes zero

180. A DC generator is based on the principle of;

(a) Electrochemical induction   (b) Electromagnetic induction

(c) Magnetic effect of current   (d) Heating effect of current

181. The maximum number of 40 W tube-lights connected in parallel which can safely be run from a 240 V supply with a 5 A fuse is;

(a) 5

(b) 15

(c) 20

(d) 30

182. The essential difference between an AC generator and a DC generator is that:

(a) AC generator has an electromagnet while a DC generator has permanent magnet

(b) DC generator will generate a higher voltage

(c) AC generator will generate a higher voltage

(d) AC generator has slip rings while the DC generator has a commutator

183. The unit of measuring the momentum of a moving body is:

(a) m/s

(b) kg.m/s

(c) kg.m/s^2

(d) N m^2/kg^2

184. The inertia of a moving object depends on:

i. Mass of the object

ii. Momentum of the object

iii. Speed of the object

iv. Shape of the object Choose the correct option:

(a) (i) and (ii)

(b) only (i)

(c) Only (ii)

(d) (iii) and (iv)

185. An object of mass 2 kg is sliding with a constant velocity of 4 m/s on a friction less horizontal table. The force required to keep the object moving with the same velocity is:

(a)   32 N

(b)   O N

(c)   2 N

(d)   8 N

186. If the energy in a longitudinal wave travels from south to north, the particles of the medium would be vibrating:

(a)   From north to south, only

(b)   Both north and south

(c)   From east to west, only

(d)   Both east and west

187. As a wave travels into a medium in which its speed increases, its wavelength would:

(a)   Decrease

(b)   Increase

(c)   Remain the same

(d)   none of the above

188. If the particles of the medium are vibrating to and fro in the same direction of energy transport, then the wave is a_____wave;

(a) Longitudinal

(b) Sound

(c) Standing

(d) Transverse

189. A ray of light enters air from water and experiences refraction, then;

(a) $\angle i = \angle r$

(b) $\angle i < \angle r$

(c) $\angle i \, \angle r$

(d) $\angle i / \angle r = 0^0$

190. An object is placed at a distance of 0.25 m in front of a plane mirror. The distance between the object and image will be;

0.25

(a) 0.25 m

(b) 1.0 m

(c) 0.5 m

(d) 0.125 m

191. The angle of incidence for a ray of light having zero reflection angle is;

(a) 0

(b) 30°

(c) 45°

(d) 90°

[55]

192. An object at a distance of 30 cm from a concave mirror gets its image at the same point. The focal length of the mirror is:

(a) - 30 cm

(b) 30 cm

(c) - 15 cm

(d) +15 cm

193. The energy released during nuclear fusion and nuclear fusion reaction is due to:

(a) Chemical reaction

(b) The conversion of electrical energy

(c) The conversion of gravitational

(d) The conversion of mass into energy

194. A suitable unit for electric field strength is:

(a) V/C

(b) C/m^2

(c) A

(d) N/C

195. An electrolyte is:

(a)   A metal

(b)   A solution

(c)   A liquid that conducts current

(d)   All of above

196. Electroplating is based on

(a)   Magnetic effect of electricity

(b)   Chemical effect of electricity

(c)   Heating effect of electricity

(d)   Physical effect of electricity

197. The refraction of light is commonly known as;

(a)   Bending

(b)   Scattering

(c)   Reflection

(d)   Interference

198. The unit of specific resistance is;

(a)   Ohm

(b)   Mho

(c)   Ohm-meter

(d)   Ohm per meter

D01 SET – A

199. Unit of magnetic flux is;

   (a)   Weber / metre^2

   (b)   Weber

   (c)   Weber/metre

   (d)   Weber-metre^2

200. Electric potential is a;

   (a)   Scalar quantity

   (b)   Vector quantity

   (c)   Neither scalar quantity nor vector quantity

   (d)   Sometimes scalar and sometimes vector