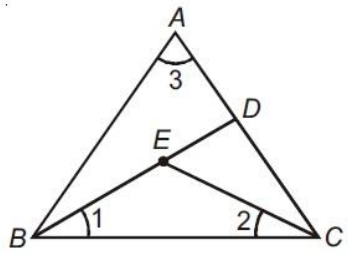
Elite 11 (PMC) Sample Paper

This question paper is a model test paper. Some of these questions may have appeared in the previous years' tests. The actual test may have a different number of questions and questions of different types. This paper is meant only to provide an idea of the kind of questions that may be asked in the test

2. The number having no reciprocal is –
   a) 2
   b) 0
   c) -1
   d) 1

3. In the given figure, $\angle 1 = \angle 2 = \angle 3$. If AD = 5 cm, DC = 4 cm and the perimeter of Δ BEC is 13 cm, then the length of BE is –



   a) 4.1 cm
   b) 3.5 cm
   c) 2 cm
   d) 5.3 cm

4. The quadrilateral formed by joining the mid-points of the sides of a quadrilateral PQRS, taken in order, is a rectangle if –
   a) PQRS is a rectangle
   b) PQRS is a parallelogram
   c) Diagonals of PQRS are perpendicular
   d) Diagonals of PQRS are equal

4. The graph of the equation $2x + 3y = 9$ cuts y-axis at the point –
   a) (0,3)
   b) (9/2,0)
   c) (0,x)
   d) (0,0

5. All the angles of a convex quadrilateral are congruent. However, not all its sides are congruent. What type of quadrilateral is it?
   a) Rectangle
   b) Square
   c) Parallelogram
   d) Trapezium

6. A bag contains 20 balls out of which ***x*** are black. If 10 more black balls are put in the box, the probability of drawing a black ball is double of what it was before. The value of ***x*** is
   a) 5
   b) 0
   c) 10
   d) 40

7. Observe the Marks distribution table below –

Marks	Number of Students
Below 5	10
Below 10	25
Below 15	37
Below 20	57
Below 25	66

   The sum of the lower limits of the median class and the modal class is –
   a) 14
   b) 30
   c) 25
   d) 35

8. $9\sec^2\theta - 9\tan^2\theta$ is equal to –
   a) 1
   b) -1
   c) -9
   d) 9

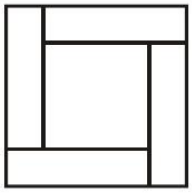
9. Which of the following is not a measure of central tendency?
   a) Mean
   b) Median
   c) Mode
   d) Range

10. The roots of the equation $\sqrt{2}x^2 + 7x + 5\sqrt{2} = 0$ are –
   a) $\sqrt{2}, \frac{5}{\sqrt{2}}$
   b) $-\sqrt{2}, \frac{5}{\sqrt{2}}$
   c) $\sqrt{2}, \frac{-5}{\sqrt{2}}$
   d) $-\sqrt{2}, \frac{-5}{\sqrt{2}}$

11. The value of ***K*** for which the equation $x^2 + kr + 64 = 0$ *and* $x^2 - 8x + k = 0$ will have real roots is –
   a) 14
   b) 14
   c) 16
   d) 18

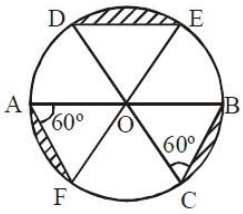
12. If $\tan A + \cot A = 4$, then $\tan^4 A + \cot^4 A =$
   a) 196
   b) 194
   c) 188
   d) 198

13. Four congruent rectangles and a square are assembled without overlapping to form a large square, as shown. Each of the rectangles has a perimeter of 40 cm. The total area of the large square is –



a) 400 cm^2
b) 200 cm^2
c) 100 cm^2
d) 800 cm^2

14. In the adjoining figure O is the centre if the circle with radius r. AB, CD and EF are the diameters of the circle. ∠ OAF = ∠ OCB = 60°. What is the area of the shaded region?



a) $\frac{r^2}{2}\left(\pi - \frac{3\sqrt{3}}{4}\right)$
b) $\frac{r^2}{2}\left(\pi - \frac{3\sqrt{3}}{2}\right)$
c) $\frac{r^2}{3}\left(\pi - \frac{3\sqrt{3}}{4}\right)$
d) $\frac{r^2}{4}\left(\pi - \frac{3\sqrt{3}}{4}\right)$

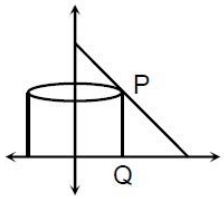
15. If the equation $(a^2 + b^2)x^2 - 2(ac + bd)x + (c^2 + d^2) = 0$ has equal roots, then –
a) $ab = cd$
b) $ad = bc$
c) $ab = \sqrt{bc}$
d) $ad = \sqrt{cd}$

16. Two consecutive odd natural numbers, the sum of whose squares is 202, are –
a) 15,17
b) 11,13
c) 13,15
d) 9,11

17. The length of the longest pole that can be kept in a room 5m long, 4m broad and 3m high is –
a) $6\sqrt{2}$
b) $7\sqrt{2}$
c) $5\sqrt{2}$
d) None of the above

18. A medicine – capsule is in the shape of a cylinder of diameter 0.5 cm with two hemispheres stuck to its ends. The length of the entire capsule is 2 cm. The capacity of the capsule is –
a) 0.33 cm
b) 0.36 cm^2
c) 0.36 cm^3
d) 0.34 cm^3

19. Let (4, k) be any point on the line y = 6 – x. If the vertical segment PQ is rotated about y-axis, the volume of the resulting cylinder



a) 32 π
b) 16 π
c) 45 π
d) 6 π

20. A train 270 m long is moving at a speed 25 km/h. It will cross a man coming from the opposite direction at 2 km/h in –
a) 32 seconds
b) 34 seconds
c) 24 seconds
d) 36 seconds

21. In an examination students of a class are made to sit in rows. If in each row, one student is increased, then the number of rows decreases by 2. If one student is less in each row, then there would be 3 additional rows. How many students are there in the class –
a) 40
b) 50
c) 70
d) 60

22. If the numbers 909, 1633 and 3624 are divided by p, they leave the same remainder q, let p be greatest of all such numbers, then p+q = ?
a) 186
b) 295
c) 15
d) None

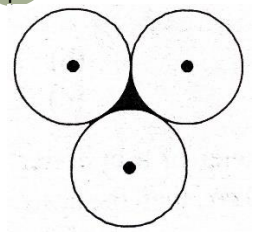
23. How many linear equations are satisfied by $x = 2\ and\ y = -3$?
a) Only one
b) Two
c) Three
d) Infinitely Many

24. If $\log_{12} 27 = a$, then $\log_6 16$ is –
a) $\frac{4(3-a)}{(3+a)}$
b) $\frac{4(3+a)}{(3-a)}$

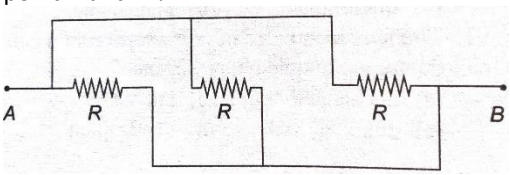
c) $\frac{(3-a)}{4(3+a)}$

d) $\frac{(3+a)}{4(3-a)}$

25. An equilateral triangle ABC in inscribed in a circle with centre O. Then ∠BOC measures –
    a) 120°
    b) 140°
    c) 90°
    d) 60°
26. In a cricket match, a batsman hits sixes 8 times of 32 balls played. The probability that a six is not hit in a ball is –
    a) -0.25
    b) 0.25
    c) 0.75
    d) 0.50
27. The current ages of Nilima and Sharad are in the ratio 3:4. After how many years their ages will be in the same ratio again?
    a) 3 years
    b) Their ages will never be in the same ratio again.
    c) 4 years
    d) 10 years
28. The length of the diagonals of a rhombus are 24 cm and 32 cm. The perimeter of the rhombus is –
    a) 80 cm
    b) 56 cm
    c) 24 cm
    d) 12 cm
29. If 5 times the 5^{th} term of an A.P is the same as 7 times the 7^{th} term, then find its 12^{th} term.
    a) 11
    b) 0
    c) 14
    d) 18
30. If a solid sphere of radius r is melted and cast into the shape of a sloid cone of height r, then the radius of the base of the cone is –
    a) 2r
    b) 5r
    c) 3r
    d) 4r
31. If three equal circles of radius 3 cm each touch each other, then the area of the shaded portion is –



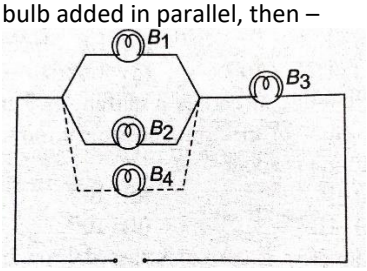
    a) $\frac{\sqrt{3}}{2}(2-\pi)cm^2$
    b) $\frac{9}{2}(2\sqrt{3}-\pi)cm^2$
    c) $\frac{9}{2}(2\sqrt{3}+\pi)cm^2$
    d) $\frac{\sqrt{3}}{2}(2+\pi)cm^2$
32. The value of cos1° cos2° cos3° … cos 179° is –
    a) 1
    b) -1
    c) 0
    d) 3/4
33. P is a prime number and (P^2 + 3) is also a prime number. The number of numbers that P can assume is –
    a) 1
    b) 2
    c) 3
    d) 4
34. Length of the shadow of a person is x when the angle of elevation of the sun is 45°. If the length of the shadow is increased by $(\sqrt{3}-1)x$, then the angle of elevation becomes –
    a) 15°
    b) 18°
    c) 25°
    d) 30°
35. A school has 20 teachers, one of them retires at the age of 60 years and a new teacher replaces him, this change reduces the average age of the staff by 2 years, the age of the new teacher is –
    a) 28 years
    b) 25 years
    c) 20 years
    d) 18 years
36. The slope of velocity – time graph for motion with uniform velocity is equal to –
    a) Final velocity
    b) Initial velocity
    c) Zero
    d) None of the above
37. What is the effective resistance between the point A and B ?



    a) R/3
    b) 4R/3
    c) 2R/3
    d) R/2
38. Watt is equal to –
    a) AΩ

b) $A^2\Omega$
c) $A\Omega^2$
d) $A\Omega^2s^{-1}$

39. Figure shows that bulbs B_1, B_2 and B_3 are connected to the mains. Suppose B_4 is another bulb added in parallel, then –

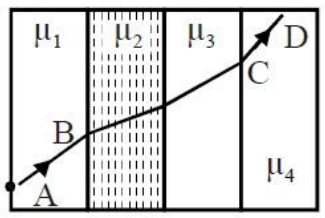


a) The brightness of B_1 will increase
b) The brightness of B_3 will increase
c) The brightness of both B_1 and B_2 will increase
d) The brightness of both B_1 and B_2 will fall

40. An atom bomb is an example of –
a) Fusion reaction
b) Controlled fission reaction
c) Uncontrolled fission reaction
d) All of the above

41. Two copper spheres of the same radius, one solid and the other hollow, are charged to the same potential. Which will have more charge?
a) Solid sphere
b) Hollow Sphere
c) Both will have equal charge
d) Nothing can be decided

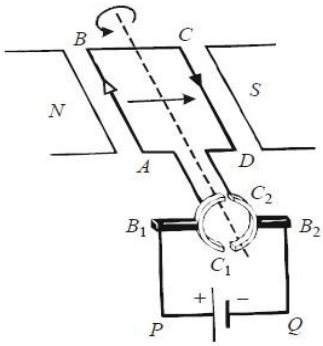
42. A ray of light passes through four transparent media with refractive indices μ_1, μ_2, μ_3 and μ_4 as shown in the figure. The surfaces of all media are parallel. If the emergent ray CD is parallel to the incident ray AB, we must have –



a) $\mu_1 = \mu_2$
b) $\mu_2 = \mu_3$
c) $\mu_3 = \mu_4$
d) $\mu_4 = \mu_1$

43. The electric potential of earth is taken as –
a) Zero
b) Infinity
c) One
d) None of these

A rotating device is shown in the fig. Observe the figure and answer the questions 44 and 45



44. The device shown in the figure is –
a) DC motor
b) AC motor
c) AC Generator
d) DC Generator

45. The direction of force acting on arm AB is –
a) Leftwards
b) Outwards (out of the paper)
c) Inwards (into the paper)
d) No force will act on AB

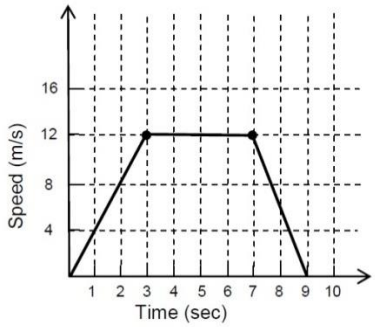
46. Tesla is the SI unit of –
a) Electric field
b) Pole strength
c) Current
d) Magnetic Field

47. What is the minimum resistance which can be made using five resistors each of 1/5 Ω?
a) 1/5 Ω
b) 25 Ω
c) 1/10 Ω
d) 1/25 Ω

48. The force between two charges when placed in free space in 5 N. If they are in a medium of relative permittivity 5, the force between them will be –
a) 1 N
b) 2 N
c) 25 N
d) 2.5 N

49. A person cannot see a distinctly object kept beyond 2 m. This defect can be corrected by using a lens of power –
a) +0.5 D
b) -0.5 D
c) +0.2 D
d) -0.2 D

50. The speed-time relation of a car whose weight is 1500 kg is as shown in the given graph. How much braking force has been applied at the end of 7 sec. to stop the car in 2 sec?



a) 9000 N
b) 2000 N
c) 1200 N
d) 4800 N

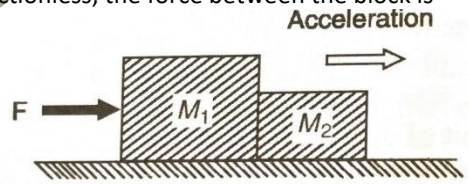
51. The ratio of one micron to one nanometre is –
a) 10^{-3}
b) 10^{-6}
c) 10^{6}
d) 10^{3}

52. A bullet loses 1/20 of its velocity after penetrating a plank. How many planks are required to stop the bullet?
a) 9
b) 11
c) 7
d) 5

53. The line joining the places on earth having the same values of *g* are called –
a) Isobars
b) Isotherms
c) Isogams
d) None of these

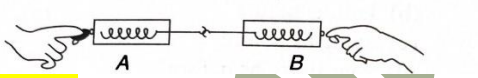
54. Rate of change of weight near the earth's surface varies with height *h* as –
a) h^0
b) h^{-1}
c) $h^{1/2}$
d) h^{-2}

55. A single horizontal force F is applied to a block of mass M_1, which is in contact with another block of mass M_2. If the surfaces are frictionless, the force between the block is –



a) $\frac{M_1F}{M_2}$
b) $\frac{M_1M_2g}{M_1+M_2}$
c) $\frac{M_2F}{M_1+M_2}$
d) None of these

56. Consider two spring balances hooked as shown in the figure. We pull them in opposite directions. If the reading shown by A is 1.5 N, the reading shown by B will be –

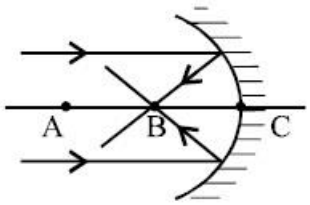


a) 1.5 N
b) 2.5 N
c) 3.0 N
d) Zero

57. If the kinetic energy of a body increases by 0.1%, then the percent increase in its momentum would be –
a) 10%
b) 1%
c) 0.1%
d) 0.05%

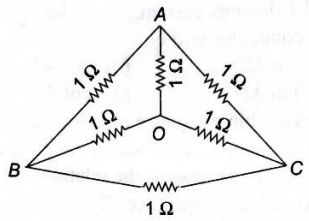
58. A motor cycle is moving along a straight horizontal road with a speed *u*. If the coefficient of friction between the tyres and the road is μ, the minimum distance in which the car can be stopped is –
a) $\frac{u^2}{\mu g}$
b) $\frac{2u^2}{\mu g}$
c) $\frac{u^2}{2\mu g}$
d) $\left(\frac{u}{\mu g}\right)^2$

59. If AB = BC in the below ray diagram following assertions are made:

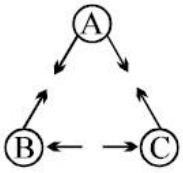


[1] B is the focus of the mirror
[2] A is the centre of the curvature
[3] C is the pole of the mirror
Then which of the assertions are correct –
a) [1] & [2] only
b) [2] & [3] only
c) Only [1] is correct
d) [1], [2] & [3] are correct

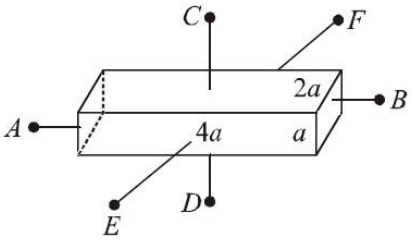
60. A mirror produces magnified erect image of an object. The nature of the mirror is –
    a) Concave
    b) Convex
    c) Plane
    d) None of the above
61. When light passes through a prism, the colour which deviates the most?
    a) Red
    b) Blue
    c) Green
    d) Violet
62. Superconductors are materials that appear to exhibit no resistance. Therefore, electrons passing through a superconductor will –
    a) generate no current
    b) generate no heat
    c) increase the current's power
    d) decrease the electrons' charge
63. Six equal resistances, each of 1 Ω, are joined to form a network as shown in the figure, Then the resistance between any two corners is –



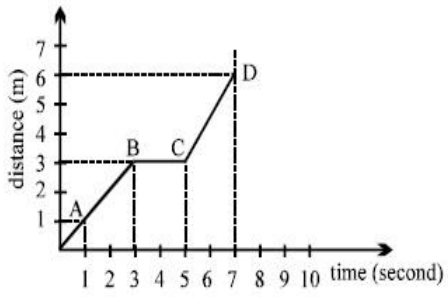
    a) 0.5 Ω
    b) 2 Ω
    c) 1 Ω
    d) 1.5 Ω
64. The spring of a winding knob of a watch has –
    a) Mechanical energy
    b) Only Kinetic Energy
    c) Only Mechanical Energy
    d) None of the above
65. The diagram below shows the arrangement of three charged hollow metal spheres, A, B, and C. The arrows indicate the direction of the electric forces acting between the spheres. At least two of the spheres are positively charged. Which sphere, if any, could be negatively charged?



    a) Sphere A
    b) Sphere B
    c) Sphere C
    d) None of the above
66. A lamp is marked 60 W, 220V. If it operates at 200 V, the rate of consumption of energy will
    a) Decrease
    b) Increase
    c) Remains unchanged
    d) First increase then decrease
67. What is the time period of a second's pendulum at the centre of the earth?
    a) 1 second
    b) 2 seconds
    c) Zero
    d) Infinity
68. A conductor with rectangular cross-section has dimensions (a × 2a × 4a) as shown in figure. Resistance across AB is x, across CD is y and across EF is z. Then –

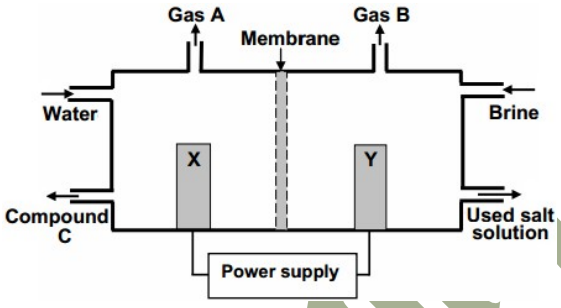


    a) x > z > y
    b) x = z = y
    c) x > y > z
    d) y > z > x
69. The rate of change of momentum represents
    a) Pressure
    b) Force
    c) Work
    d) Kinetic energy
70. The graph below shows the position of a body at different times. The velocity of body is maximum for part –



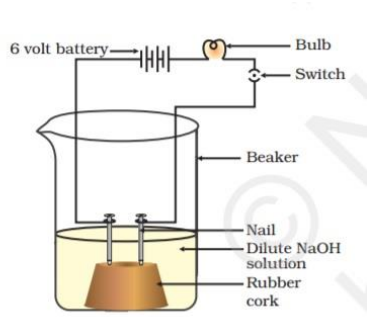
    a) CD
    b) AB
    c) BC
    d) AC

71. Which of the given elements A, B, C, D and E with atomic number 2, 3, 7, 10 and 30 respectively belong to the same period?
    a) A, B, C
    b) B, C, D
    c) A, D, E
    d) B, D, E
72. Barium Chloride on reacting with ammonium sulphate forms barium sulphate and ammonium chloride. Which of the following correctly represents the type of the reaction involved?
    [1] Displacement Reaction
    [2] Precipitation Reaction
    [3] Combination Reaction
    [4] Double Displacement Reaction
    a) [1] and [2]
    b) [2] only
    c) [4] only
    d) [2] and [4]
73. At STP, 2 gm of helium gas occupies a volume of –
    a) 11.2 L
    b) 22.4 L
    c) 5.6 L
    d) 2 L
74. If Na_2CO_3 is added to the solution of H_2CO_3, the pH of H_2CO_3 solution –
    a) Decreases
    b) Increases
    c) Remains constant
    d) Cannot be predicted
75. An element exists in only two isotopic forms in nature, one having 8 neutrons and other 10. Both of them have eight protons each. If the average atomic weight of the element is 16.2 u then % abundance of isotope with 8 neutrons is –
    a) 10%
    b) 80%
    c) 20%
    d) 90%
76. How many moles of ferric alum $(NH_4)_2SO_4.Fe_2(SO_4)_3.24H_2O$ can be made from the sample of Fe containing 0.0056 gm of it. (Atomic mass of Fe = 56u)
    a) 10^{-4} mol
    b) 0.33×10^{-4} mol
    c) 2×10^{-4} mol
    d) 0.5×10^{-4} mol
77. The figure shows a simplified diagram of a cell used in chlor-alkali process. What are the products of chlor-alkali process?



    a) NaCl, Cl_2 and H_2
    b) H_2, Cl_2 and NaOH
    c) Cl_2, Na_2CO_3 and H_2O
    d) NaOH, Cl_2 and HCl
78. Which of the following pairs are members of a Homologous series?
    a) CH_3OCH_3 ; CH_3CH_2–OH
    b) CH_3–CHO ; CH_3CHO
    c) CH_3CH_2COOH ; CH_3COOCH_3
    d) CH_3–CHO ; CH_3CH_2CHO
79. As electron moves away from the nucleus, its potential energy –
    a) Increases
    b) Decreases
    c) Remains constant
    d) None of these
80. P-orbital can accommodate a maximum of _____ electrons –
    a) 2
    b) 6
    c) 8
    d) 10
81. Element A has electronic configuration 2,7. B has configuration 2,8,6. C has configuration 2,8,8 while D has 2,8,7. Which elements will show similar chemical properties?
    a) A and C
    b) A and D
    c) B and C
    d) B and D
82. Variable valency, in general is exhibited by –
    a) Gaseous elements
    b) S – block elements
    c) Non – metals
    d) Transition elements
83. Which amongst the following contains double covalent bond –
    a) C_2H_2
    b) C_2H_6
    c) C_2H_4
    d) C_3H_8

84. Which of the following statements is **INCORRECT**?
    a) The conjugate base of $H_2PO_4^-$ is HPO_4^{2+}
    b) H_3PO_3 is a tribasic acid
    c) The pH of 1 M HCl is 0
    d) The concentration of H^+ ions in pure water is 10^{-7} mol L^{-1} at 298 K.
85. In an attempt to demonstrate electrical conductivity through an electrolyte, the following apparatus was set up.



    Which statement(s) is (are) correct?
    (i) Bulb will not glow because electrolyte is not acidic.
    (ii) Bulb will not glow because NaOH is a strong base and furnishes ions for conduction.
    (iii) Bulb will not glow because it the circuit is incomplete.
    (iv) Bulb will not glow because it depends upon the type of electrolytic solution.
    a) (i) and (iii)
    b) (ii) and (iv)
    c) (ii) only
    d) (iv) only
86. The process of reduction involves –
    a) Removal of hydrogen
    b) Gain of electrons
    c) Addition of oxygen
    d) Loss of electrons
87. How many isomers are possible for an alkane with molecular formula C_4H_{10}?
    a) 2
    b) 3
    c) 4
    d) 5
88. $a MnO_2 + b HCl \rightarrow c MnCl_2 + d H_2O + e Cl_2$
    $p C_2H_5OH + q O_2 \rightarrow r CO_2 + s H_2O$
    a, c, q and ***r*** in the above chemical equations respectively are –
    a) 2, 4, 2 and 1
    b) 4, 2, 2 and 1
    c) 1, 1, 1 and 3
    d) 2, 1, 4 and 2
89. Which of the following is used as "clean fuel"
    a) Petrol
    b) Mineral oil
    c) Methane
    d) LPG
90. Four identical flasks are filled with hydrogen, oxygen carbon dioxide and chlorine ar the same temperature and pressure. The flask with the greatest mass will be the one containing –
    a) Hydrogen
    b) Oxygen
    c) Carbon Dioxide
    d) Chlorine
91. An atom has an atomic number 13 and mass number 27. How many electrons will it have in its valence shell?
    a) 1
    b) 2
    c) 3
    d) 5
92. Upto which element the law of octaves was found to be applicable?
    a) Oxygen
    b) Calcium
    c) Cobalt
    d) Potassium
93. Based on the table below, what can you say about Co and Ni?

	Atomic Number	Atomic Mass
Co	27	59
Ni	28	59

    a) They have the same number of protons.
    b) They have the same number of neutrons.
    c) They have the same number of electrons.
    d) None of these is possible.
94. 5.85 grams of NaCl was treated with concentrated H_2SO_4 and the gas evolved was passed into a solution of silver nitrate. The white precipitate obtained was filtered, dried and weighed. Assuming complete reaction, how many grams of precipitate was obtained? [Atomic mass of Ag = 108 u, Na = 23 u & Cl = 35.5 u]
    a) 10.8 grams
    b) 14.35 grams
    c) 35.5 grams
    d) 3.65 grams
95. The normality of 0.3 M phosphoric acid is-
    a) 0.9
    b) 0.1

c) 0.3
d) 0.6

96. How many grams of SbF_3 are needed to produce a gram of Freon – 12 CCl_2F_2, according to the reaction :
$CCl_4 + SbF_3 \rightarrow CCl_2F_2 + SbCl_3$

Substance	Molar Mass
SbF_3	179 g mol^{-1}
CCl_2F_2	121 g mol^{-1}

a) 0.667 gm
b) 0.986 gm
c) 1.50 gm
d) 2.22 gm

97. Which of the following elements form amphoteric oxides?
a) Beryllium
b) Aluminium
c) Zinc
d) All

98. An example of a soap is –
a) CH_3COONa
b) $C_{17}H_{35}COONa$
c) CH_3ONa
d) $C_{17}H_{35}COOC_2H_5$

99. Which of the following is NOT a valid electronic structure –
a) 2,8,4
b) 2,6
c) 2,9,1
d) 2,8,8,2

100. A hydrocarbon contains carbon and hydrogen in the molar ratio of 1:1.5. The correct molecular formula of the compound is –
a) C_2HO_3
b) C_4H_6
c) CH_3
d) Data is not sufficient