Consortium of Medical Engineering and Dental Colleges of Karnataka
(COMEDK-2008)

DATE	SUBJECT	TIME
19 - 04 - 2008	PHYSICS & CHEMISTRY (COMBINED PAPER)	10.00 AM to 12.30 PM

IMPORTANT INSTRUCTIONS TO CANDIDATES

(Candidates are advised to read the following instructions carefully, before answering on OMR answer sheet.)

1. Ensure that CET No. has been entered and shaded the respective circles on the OMR answer sheet.
2. **ENSURE THAT THE TIMING, MARKS PRINTED ON THE OMR ANSWER SHEET ARE NOT DAMAGED/ MUTILATED / SPOILED.**
3. This Question Booklet is issued to you by the invigilator after the 2nd Bell i.e., after 10.00 a.m.
4. Enter the Serial Number of this question booklet on the OMR answer sheet.
5. Carefully enter the Version Code of this question booklet on the OMR answer sheet and SHADE the respective circles completely.
6. As answer sheets are designed to suit the Optical Mark Reader (OMR) system, please take special care while filling and shading the CET NO. & Version Code of this question booklet.
7. DO NOT FORGET TO SIGN AT THE BOTTOM PORTION OF OMR ANSWER SHEET IN THE SPACE PROVIDED.
8. Until the 3rd Bell is rung at 10.10 a.m. :
    *   Do not remove the staple present on the right hand side of this question booklet.
    *   Do not look inside this question booklet.
    *   Do not start answering on the OMR answer sheet.
9. After the 3rd Bell is rung at 10.10 a.m., remove the staple present on the right hand side of this question booklet and start answering on the OMR answer sheet.
10. This question booklet contains 120 questions and each question will have four different options / choices.
11. During the subsequent 140 minutes :
    *   Read each question carefully.
    *   Determine the correct answer from out of the four available options / choices given under each question.
    *   **Completely darken / shade the relevant circle with a BLUE OR BLACK INK BALLPOINT PEN against the question number on the OMR answer sheet.**

CORRECT METHOD OF SHADING THE CIRCLE ON THE OMR SHEET IS AS SHOWN BELOW :

① ② ● ④

12. Please note that even a minute unintended ink dot on the OMR sheet will also be recognised and recorded by the scanner. Therefore, avoid multiple markings of any kind on the OMR answer sheet.
13. Use the space provided on each page of the question booklet for Rough Work AND do not use the OMR answer sheet for the same.
14. After the last bell is rung at 12.30 p.m., stop writing on the OMR answer sheet and affix your LEFT HAND THUMB IMPRESSION on the OMR answer sheet as per the instructions.
15. Hand over the OMR ANSWER SHEET to the room invigilator as it is.
16. After separating and retaining the top sheet (KEA Copy), the invigilator will return the bottom sheet replica (Candidate's copy) to you to carry home for self-evaluation
17. Preserve the replica of the OMR answer sheet for a minimum period of One year.

PHYSICS

1. A ray of light enters from a rarer to a denser medium. The angle of incidence is i. Then the reflected and refracted rays are mutually perpendicular to each other. The critical angle for the pair of media is

   1) $Sin^{-1}(Tan\,i)$

   2) $Tan^{-1}(Sin\,i)$

   3) $Sin^{-1}(Cot\,i)$

   4) $Cos^{-1}(Tan\,i)$

2. A fish in water (refractive index n) looks at a bird vertically above in the air. If y is the height of the bird and x is the depth of the fish from the surface, then the distance of the bird as estimated by the fish is
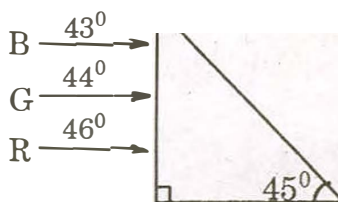
   1) $x + y\left(1 - \dfrac{1}{n}\right)$

   2) $x + ny$

   3) $x + y\left(1 + \dfrac{1}{n}\right)$

   4) $y + x\left(1 - \dfrac{1}{n}\right)$

3. Figure shows a mixture of blue, green and red coloured rays incident normally on a right angled prism. The critical angles of the material of the prism for red, green and blue are 46^0, 44^0 and 43^0 respectively. The arrangement will separate

   1) red colour from blue and green

   2) blue colour from red and green

   3) green colour from red and blue

   4) all the three colours.

4. A convex and a concave lens seperated by distance d are then put in contact. The focal length of the combination
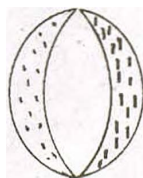
   1) decreases

   2) increases

   3) becomes 0

   4) remains the same

5. A convex lens is made of 3 layers of glass of 3 different materials as in the figure. A point object is placed on its axis. The number of images of the object are

   1) 1

   2) 2

   3) 3

   4) 4

6. If μ_0 is permeability of free space and ϵ_0 is permittivity of free space, the speed of light in vacuum is given by

1) $\sqrt{\mu_0 \epsilon_0}$

2) $\sqrt{\mu_0/\epsilon_0}$

3) $\sqrt{\dfrac{1}{\mu_0 \epsilon_0}}$

4) $\sqrt{\epsilon_0/\mu_0}$

7. In Young's double slit experiment, a third slit is made in between the double slits. Then
   1) intensity of fringes totally disappears.
   2) only bright light is observed on the screen.
   3) fringes of unequal width are formed.
   4) contrast between bright and dark fringes is reduced.

8. The maximum number of possible interference maxima when slit separation is equal to 4 times the wavelength of light used in a double slit experiment is

   1) ∞

   2) 9

   3) 8

   4) 4

9. In a Fraunhofer diffraction experiment at a single slit using a light of wavelength 400 nm, the first minimum is formed at an angle of 30^0. The direction θ of the first secondary maximum is given by

   1) $Sin^{-1} 2/3$

   2) $Sin^{-1} 3/4$

   3) $Sin^{-1} 1/4$

   4) $Tan^{-1} 2/3$

10. Maximum diffraction takes place in a given slit for
    1) γ - rays
    2) ultraviolet light
    3) infrared light
    4) radio waves

11. An unpolarised beam of intensity I_0 falls on a polaroid. The intensity of the emergent light is

1) $I_0/2$

2) I_0

3) $I_0/4$

4) Zero

12. Which of the following is a dichroic crystal ?
    1) Quartz

    2) Tourmaline

    3) Mica

    4) Selenite

13. Two identical metal spheres charged with $+12\,\mu F$ and $-8\,\mu F$ are kept at certain distance in air. They are brought into contact and then kept at the same distance. The ratio of the magnitudes of electrostatic forces between them before and after contact is

1) $12:1$

2) $8:1$

3) $24:1$

4) $4:1$

14. A small conducting sphere of radius r is lying concentrically inside a bigger hollow conducting sphere of radius R. The bigger and smaller spheres are charged with Q and q $(Q > q)$ and are insulated from each other. The potential difference between the spheres will be

1) $\dfrac{1}{4\pi\epsilon_0}\left(\dfrac{q}{r}-\dfrac{q}{R}\right)$

2) $\dfrac{1}{4\pi\epsilon_0}\left(\dfrac{q}{R}-\dfrac{Q}{r}\right)$

3) $\dfrac{1}{4\pi\epsilon_0}\left(\dfrac{q}{r}-\dfrac{Q}{R}\right)$

4) $\dfrac{1}{4\pi\epsilon_0}\left(\dfrac{Q}{R}+\dfrac{q}{r}\right)$

15. The charges Q, $+q$ and $+q$ are placed at the vertices of an equilateral triangle of side l. If the net electrostatic potential energy of the system is zero, then Q is equal to
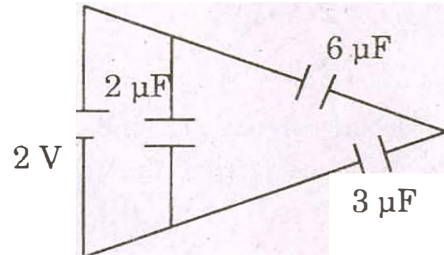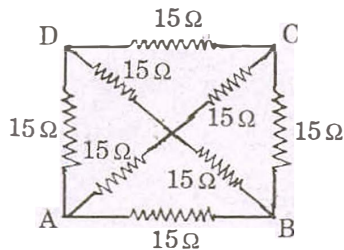
1) $-q/2$

2) $-q$

3) $+q/2$

4) zero

16. How many $6\,\mu F$, 200 V condensers are needed to make a condenser of $18\,\mu F$, 600 V?

    1) 9

    2) 18

    3) 3

    4) 27

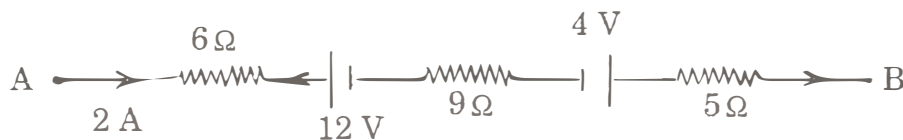17. The total energy stored in the condenser system shown in the figure will be

    6 μF

    2 μF

    2 V

    3 μF

    1) $2\,\mu J$

    2) $4\,\mu J$

    3) $8\,\mu J$

    4) $16\,\mu J$

18. A metal wire is subjected to a constant potential difference. When the temperature of the metal wire increases, the drift velocity of the electron in it

    1) increases, thermal velocity of the electron decreases

    2) decreases, thermal velocity of the electron decreases

    3) increases, thermal velocity of the electron increases

    4) decreases, thermal velocity of the electron increases

19. The equivalent resistance between the points A and B will be (each resistance is 15 Ω)

    15 Ω
    D — C
    15 Ω
    15 Ω
    15 Ω   15 Ω   15 Ω
    15 Ω
    A — B
    15 Ω

    1) 30 Ω

    2) 8 Ω

    3) 10 Ω

    4) 40 Ω

20. The terminals of a 18 V battery with an internal resistance of 24 Ω are connected to a circular wire of resistance 24 Ω at two points distant at one quarter of the circumference of a circular wire. The current through the bigger arc of the circle will be

    1) 0.75 A

    2) 1.5 A

    3) 2.25 A

    4) 3 A

21. The potential difference between A and B in the following figure is

$$A \xrightarrow{\quad} \underset{2\,A}{\overset{6\,\Omega}{\text{wwww}}} \dashv\vdash \underset{12\,V}{\overset{9\,\Omega}{\text{wwww}}} \vdash\dashv \overset{4\,V}{\underset{5\,\Omega}{\text{wwww}}} \xrightarrow{\quad} B$$

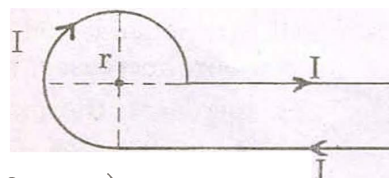   1) 32 V   2) 48 V
    3) 24 V   4) 14 V

22. The magnetic field at the centre of a circular current carrying conductor of radius r is B . The magnetic field on its axis at a distance r from the centre is B . The value of $B_c : B_a$ will be

    1) $1 : \sqrt{2}$ 2) $1 : 2\sqrt{2}$

    3) $2\sqrt{2} : 1$ 4) $\sqrt{2} : 1$

23. Current 'I' is flowing in a conductor shaped as shown in the figure. The radius of the curved part is r and the length of straight portion is very large. The value of the magnetic field at the centre O will be

    1) $\dfrac{\mu_0 I}{4\pi r}\left(\dfrac{3\pi}{2} + 1\right)$ 2) $\dfrac{\mu_0 I}{4\pi r}\left(\dfrac{3\pi}{2} - 1\right)$

    3) $\dfrac{\mu_0 I}{4\pi r}\left(\dfrac{\pi}{2} + 1\right)$ 4) $\dfrac{\mu_0 I}{4\pi r}\left(\dfrac{\pi}{2} - 1\right)$

24. Two tangent galvanometers A and B are identical except in their number of turns. They are connected in series. On passing a current through them, deflections of 60^0 and 30^0 are produced. The ratio of the number of turns in A and B is

    1) $1 : 3$ 2) $3 : 1$
    3) $1 : 2$ 4) $2 : 1$

25. The resultant force on the current loop $PQRS$ due to a long current carrying conductor will be
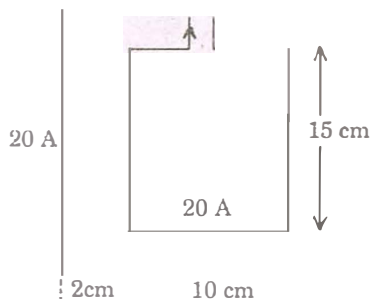
    1) $10^{-4} N$

    2) $3.6 \times 10^{-4} N$

    3) $1.8 \times 10^{-4} N$

    4) $5 \times 10^{-4} N$

26. A certain current on passing through a galvanometer produces a deflection of 100 divisions. When a shunt of one ohm is connected, the deflection reduces to 1 division. The galvanometer resistance is

1) $100 \; \Omega$ 2) $99 \; \Omega$

3) $10 \; \Omega$ 4) $9.9 \; \Omega$

27. Two similar circular loops carry equal currents in the same direction. ●n moving the coils further apart, the electric current will

1) increase in both
2) decrease in both
3) remain unaltered
4) increases in one and decreases in the second

28. The value of alternating emf E in the given circuit will be

$\leftarrow V_R = 80 \; V \rightarrow$ $\leftarrow V_C = 100 \; V \rightarrow$

$\leftarrow V_L = 40 \; V \rightarrow$

E, 50 Hz
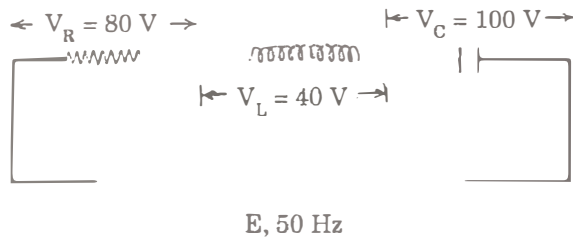
1) 220 V   2) 140 V

3) 100 V   4) 20 V

29. A current of 5A is flowing at 220 V in the primary coil of a transformer. If the voltage produced in the secondary coil is 2200 V and 50% of power is lost, then the current in the secondary will be

1) 2.5 A   2) 5 A

3) 0.25 A   4) 0.5 A

30. For a series LCR circuit at resonance, the statement which is not true is

1) Peak energy stored by a capacitor = peak energy stored by an inductor
2) Average power = apparent power
3) Wattless current is zero
4) Power factor is zero

31. Solar spectrum is an example for
    1) line emission spectrum
    2) continuous emission spectrum
    3) band absorption spectrum
    4) line absorption spectrum

32. When a piece of metal is illuminated by a monochromatic light of wavelength λ, then stopping potential is $3Vs$. When same surface is illuminated by light of wavelength 2λ, then stopping potential becomes Vs. The value of threshold wavelength for photoelectric emission will be
    1) 4λ
    2) 8λ
    3) $\frac{4}{3}\lambda$
    4) 6λ

33. The maximum kinetic energy of emitted electrons in a photoelectric effect does not depend upon
    1) wavelength
    2) frequency
    3) intensity
    4) work function

34. The ratio of minimum wavelengths of Lyman and Balmer series will be
    1) 1.25
    2) 0.25
    3) 5
    4) 10

35. Hydrogen atom does not emit X-rays because
    1) it contains only a single electron
    2) energy levels in it are far apart
    3) its size is very small
    4) energy levels in it are very close to each other

36. If an electron and a proton have the same de-Broglie wavelength, then the kinetic energy of the electron is

   1) zero
   2) less than that of a proton
   3) more than that of a proton
   4) equal to that of a proton

37. Two protons are kept at a separation of $40\,A$. F_n is the nuclear force and F_e is the electrostatic force between them. Then

   1) $F_n >> F_e$
   2) $F_n = F_e$
   3) $F_n << F_e$
   4) $F_n \approx F_e$

38. Blue colour of sea water is due to

   1) interference of sunlight reflected from the water surface
   2) scattering of sunlight by the water molecules
   3) image of sky in water
   4) refraction of sunlight

39. The ratio of the nuclear radii of elements with mass numbers 216 and 125 is

   1) $216 : 125$
   2) $\sqrt{216} : \sqrt{125}$
   3) $6 : 5$
   4) none of these

40. On bombarding U^{235} by slow neutron, 200 MeV energy is released. If the power output of atomic reactor is 1.6 MW, then the rate of fission will be

   1) $5 \times 10^{22}/s$
   2) $5 \times 10^{16}/s$
   3) $8 \times 10^{16}/s$
   4) $20 \times 10^{16}/s$

41. The masses of two radioactive substances are same and their half lives are 1 year and 2 years respectively. The ratio of their activities after 6 years will be

    1) $1:4$
    2) $1:2$
    3) $1:3$
    4) $1:6$

42. $_{92}U^{235}$ undergoes successive disintegrations with the end product of $_{82}Pb^{203}$. The number of α and β particles emitted are

    1) $\alpha = 6, \beta = 4$
    2) $\alpha = 6, \beta = 0$
    3) $\alpha = 8, \beta = 6$
    4) $\alpha = 3, \beta = 3$

43. The most stable particle in Baryon group is

    1) neutron
    2) omega - particle
    3) proton
    4) lamda - particle

44. In an unbiased p-n junction

    1) Potential at p is more than that at n
    2) Potential at p is less than that at n
    3) Potential at p is equal to that at n
    4) Potential at p is +ve and that at n is −ve

45. To get an output $y = 1$ from the circuit shown, the inputs A, B and C must be respectively
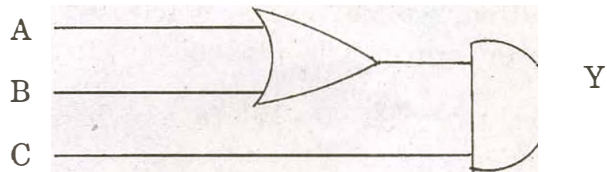
    1) 0, 1, 0
    2) 1, 0, 0
    3) 1, 0, 1
    4) 1, 1, 0

46. Dimensional formula for the universal gravitational constant G is

1) $M^{-1}L^2T^{-2}$

2) $M^0L^0T^0$

3) $M^{-1}L^3T^{-2}$

4) $M^{-1}L^3T^{-1}$

47. A body is projected vertically upwards. The times corresponding to height h while ascending and while descending are t_1 and t_2 respectively. Then the velocity of projection is (g is acceleration due to gravity)

1) $g\sqrt{t_1 t_2}$

2) $\dfrac{g t_1 t_2}{t_1 + t_2}$

3) $\dfrac{g\sqrt{t_1 t_2}}{2}$

4) $\dfrac{g(t_1 + t_2)}{2}$

48. A mass of 10 kg is suspended from a spring balance. It is pulled aside by a horizontal string so that it makes an angle of 60^0 with the vertical. The new reading of the balance is

1) 20 kg.wt

2) 10 kg.wt

3) $10\sqrt{3}$ kg.wt

4) $20\sqrt{3}$ kg.wt

49. A body weighs 50 grams in air and 40 grams in water. How much would it weigh in a liquid of specific gravity 1.5?

1) 30 grams

2) 35 grams

3) 65 grams

4) 45 grams

50. A body of mass 4 kg is accelerated upon by a constant force, travels a distance of 5 m in the first second and a distance of 2 m in the third second. The force acting on the body is

1) 2 N

2) 4 N

3) 6 N

4) 8 N

51. A simple pendulum is suspended from the ceiling of a lift. When the lift is at rest its time period is T. With what acceleration should the lift be accelerated upwards in order to reduce its period to $T/2$? (g is acceleration due to gravity).

    1) $2g$ 2) $3g$

    3) $4g$ 4) g

52. If γ is the ratio of specific heats and R is the universal gas constant, then the molar specific heat at constant volume C_v is given by

    1) γR 2) $\dfrac{(\gamma-1)R}{\gamma}$

    3) $\dfrac{R}{\gamma-1}$ 4) $\dfrac{\gamma R}{\gamma-1}$

53. An ideal gas is taken via path $ABCA$ as shown in figure. The network done in the whole cycle is

    1) $3P_1V_1$

    2) $-3P_1V_1$

    3) $6P_1V_1$

    4) zero
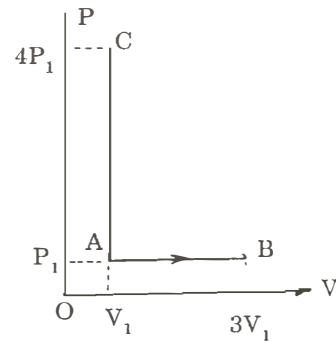
54. In which of the processes, does the internal energy of the system remain constant ?

    1) Adiabatic   2) Isochoric

    3) Isobaric   4) Isothermal

55. The coefficient of thermal conductivity of copper is 9 times that of steel. In the composite cylindrical bar shown in the figure, what will be the temperature at the junction of copper and steel ?

    1) 75^0C 2) 67^0C
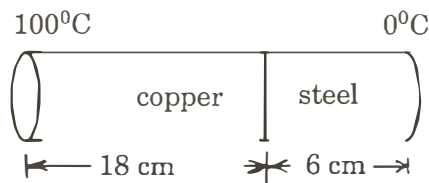
    3) 25^0C 4) 33^0C

56. The equation of a simple harmonic wave is given by $y = 6 Sin\, 2\pi (2t - 0.1x)$, where x and y are in mm and t is in seconds. The phase difference between two particles 2 mm apart at any instant is

1) 18^0
2) 36^0

3) 54^0
4) 72^0

57. With what velocity should an observer approach a stationary sound source so that the apparent frequency of sound should appear double the actual frequency? (v is velocity of sound).

1) $v/2$
2) $3v$

3) $2v$
4) v

58. If a black body emits 0.5 joules of energy per second when it is at 27^0C, then the amount of energy emitted by it when it is at 627^0C will be

1) 40.5 J
2) 162 J

3) 13.5 J
4) 135 J

59. A string vibrates with a frequency of 200 Hz. When its length is doubled and tension is altered, it begins to vibrate with a frequency of 300 Hz. The ratio of the new tension to the original tension is

1) 9 : 1
2) 1 : 9

3) 3 : 1
4) 1 : 3

60. How many times more intense is a 60 dB sound than a 30 dB sound ?

1) 1000
2) 2

3) 100
4) 4

CHEMISTRY

61. The correct order in which the first ionisation potential increases is

1) Na, K, Be

2) K, Na, Be

3) K, Be, Na

4) Be, Na, K

62. 10 cm^3 of 0.1 N monobasic acid requires 15 cm^3 of sodium hydroxide solution whose normality is

1) 1.5 N

2) 0.15 N

3) 0.066 N

4) 0.66 N

63. The IUPAC name for tertiary butyl iodide is

1) 4-Iodobutane

2) 2-Iodobutane

3) 1-Iodo, 3-methyl propane

4) 2-Iodo 2-methyl propane

64. When sulphur dioxide is passed in an acidified $K_2Cr_2O_7$ solution, the oxidation state of sulphur is changed from

1) $+4$ to 0

2) $+4$ to $+2$

3) $+4$ to $+6$

4) $+6$ to $+4$

65. Mass of 0.1 mole of Methane is

1) 1 g

2) 16 g

3) 1.6 g

4) 0.1 g

66. Methoxy methane and ethanol are

    1) Position isomers   2) Chain isomers

    3) Functional isomers   4) Optical isomers

67. When the azimuthal quantum number has the value of 2, the number of orbitals possible are

    1) 7   2) 5

    3) 3   4) 0

68. For the reaction $Fe_2O_3 + 3CO \longrightarrow 2Fe + 3CO_2$ the volume of carbon monoxide required to reduce one mole of ferric oxide is

    1) 22.4 dm^3 2) 44.8 dm^3

    3) 67.2 dm^3 4) 11.2 dm^3

69. The monomers of Buna-S rubber are

    1) vinyl chloride and sulphur   2) butadiene

    3) styrene and butadiene   4) isoprene and butadiene

70. An element with atomic number 21 is a

    1) halogen   2) representative element

    3) transition element   4) alkali metal

71. The maximum number of hydrogen bonds that a molecule of water can have is
    1) 1   2) 2

    3) 3   4) 4

72. A gas deviates from ideal behaviour at a high pressure because its molecules
    1) attract one another   2) show the Tyndall effect

    3) have kinetic energy   4) are bound by covalent bonds

73. The reagent used to convert an alkyne to alkene is
    1) $Zn \: / \: HCl$ 2) $Sn \: / \: HCl$

    3) $Zn-Hg \: / \: HCl$ 4) $Pd \: / \: H_2$

74. When compared to ΔG^0 for the formation of Al_2O_3, the ΔG^0 for the formation of Cr_2O_3 is
    1) higher   2) lower

    3) same   4) unpredicted

75. In order to increase the volume of a gas by 10%, the pressure of the gas should be
    1) increased by 10 %   2) increased by 1 %

    3) decreased by 10 %   4) decreased by 1 %

76. Catalytic dehydrogenation of a primary alcohol gives a
   1) secondary alcohol
   2) aldehyde
   3) ketone
   4) ester

77. Excess of PCl_5 reacts with conc. H_2SO_4 giving
   1) chlorosulphonic acid
   2) thionyl chloride
   3) sulphuryl chloride
   4) sulphurous acid

78. If one mole of ammonia and one mole of hydrogen chloride are mixed in a closed container to form ammonium chloride gas, then
   1) $\Delta H > \Delta u$
   2) $\Delta H = \Delta u$
   3) $\Delta H < \Delta u$
   4) there is no relationship

79. The compound on dehydrogenation gives a ketone. The original compound is
   1) primary alcohol
   2) secondary alcohol
   3) tertiary alcohol
   4) carboxylic acid

80. Which is the most easily liquifiable rare gas ?
   1) Xe
   2) Kr
   3) Ar
   4) Ne

81. Mesomeric effect involves delocalisation of

    1) pi electrons   2) sigma electrons

    3) protons   4) none of these

82. Which of the following has the maximum number of unpaired 'd' electrons ?

    1) Zn^{2+} 2) Fe^{2+}

    3) Ni^{3+} 4) Cu^{+}

83. One mole of which of the following has the highest entropy?

    1) liquid nitrogen   2) hydrogen gas

    3) mercury   4) diamond

84. Which of the following species does not exert a resonance effect ?

    1) $C_6H_5NH_2$ 2) $C_6H_5\overset{+}{N}H_3$

    3) C_6H_5OH 4) C_6H_5Cl

85. A complex compound in which the oxidation number of a metal is zero is

    1) $K_4[Fe(CN)_6]$ 2) $K_3[Fe(CN)_6]$

    3) $[Ni(CO)_4]$ 4) $[Pl(NH_3)_4]Cl_2$

86. Three moles of PCl_5, three moles of PCl_3 and two moles of Cl_2 are taken in a closed vessel. If at equilibrium the vessel has 1.5 moles of PCl_5, the number of moles of PCl_3 present in it is

    1) 5   2) 3

    3) 6   4) 4.5

87. How many optically active stereomers are possible for butan-2, 3-diol ?

    1) 1   2) 2

    3) 3   4) 4

88. An octahedral complex is formed when hybrid orbitals of the following type are involved

    1) sp^3 2) $d\,sp^2$

    3) d^2sp^3 4) sp^2d^2

89. For the reaction $2HI_{(g)} \rightleftharpoons H_{2(g)} + I_{2(g)} - Q\,KJ$, the equilibrium constant depends upon

    1) temperature   2) pressure

    3) catalyst   4) volume

90. The angle strain in cyclobutane is

    1) $24^0 44'$ 2) $29^0 16'$

    3) $19^0 22'$ 4) $9^0 44'$

91. The number of nodal planes present in σ^*s antibonding orbitals is

    1) 1   2) 2

    3) 0   4) 3

92. Which of the following electrolytic solutions has the least specific conductance ?

    1) 0.02 N   2) 0.2 N

    3) 2 N   4) 0.002 N

93. The overlapping of orbitals in benzene is of the type

    1) $sp - sp$ 2) $p - p$

    3) $sp^2 - sp^2$ 4) $sp^3 - sp^3$

94. The calculated bond order of superoxide ion $\left(O_2^-\right)$ is

    1) 2.5   2) 2

    3) 1.5   4) 1

95. Which of the following can be measured by the Ostwald-Walker dynamic method ?

    1) Relative lowering of vapour pressure
    2) Lowering of vapour pressure
    3) Vapour pressure of the solvent
    4) all of these

96. n-propyl bromide on treating with alcoholic *KOH* produces

1) propane

2) propene

3) propyne

4) propanol

97. Mercury is a liquid metal because

1) it has a completely filled s-orbital

2) it has a small atomic size

3) it has a completely filled d-orbital that prevents d-d overlapping of orbitals

4) it has a completely filled d-orbital that causes d-d overlapping

98. A compound is formed by elements A and B. This crystallises in the cubic structure where the A atoms are at the corners of the cube and B atoms are at the body centres. The simplest formula of the compound is

1) AB

2) A_6B

3) A_8B_4

4) AB_6

99. Anisole can be prepared by the action of methyl iodide on sodium phenate. The reaction is called

1) Wurtz's reaction

2) Williamson's reaction

3) Fittig's reaction

4) Etard's reaction

100. Malleability and ductility of metals can be accounted due to

1) the presence of electrostatic force

2) the crystalline structure in metal

3) the capacity of layers of metal ions to slide over the other

4) the interaction of electrons with metal ions in the lattice

101. An ionic compound is expected to have tetrahedral structure if r_+ / r_- lies in the range of

    1) 0.414 to 0.732   2) 0.225 to 0.414

    3) 0.155 to 0.225   4) 0.732 to 1

102. Among the following, which is least acidic ?

    1) phenol   2) O-cresol

    3) p-nitrophenol   4) p-chlorophenol

103. A ligand can also be regarded as

    1) Lewis acid   2) Bronsted base

    3) Lewis base   4) Bronsted acid

104. The colour of sky is due to

    1) transmission of light

    2) wavelength of scattered light

    3) absorption of light by atmospheric gases

    4) All of these

105. Which of the following organic compounds answers to both iodoform test and Fehling's test?

    1) ethanol   2) methanal

    3) ethanal   4) propanone

106. Helium is used in balloons in place of hydrogen because it is

    1) incombustible   2) lighter than hydrogen

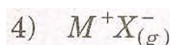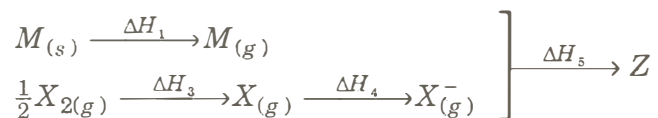   3) radioactive   4) more abundant than hydrogen

107. The basic principle of Cottnell's precipitator is

    1) Le-chatelier's principle

    2) peptisation

    3) neutralisation of charge on colloidal particles

    4) scattering of light

108. When carbon monoxide is passed over solid caustic soda heated to 200^0C, it forms

    1) Na_2CO_3 2) $NaHCO_3$

    3) $HCOONa$ 4) CH_3COONa

109. $N_2 + 3H_2 \rightleftharpoons 2NH_3$ + heat. What is the effect of the increase of temperature on the equilibrium of the reaction?

    1) equilibrium is shifted to the left

    2) equilibrium is shifted to the right

    3) equilibrium is unaltered

    4) reaction rate does not change

110. Hydrogen gas is not liberated when the following metal is added to dil. HCl

    1) Ag 2) Zn

    3) Mg 4) Sn

111. Consider the Born-Haber cycle for the formation of an ionic compound given below and identify the compound (Z) formed.

$$M_{(s)} \xrightarrow{\Delta H_1} M_{(g)}$$
$$\frac{1}{2}X_{2(g)} \xrightarrow{\Delta H_3} X_{(g)} \xrightarrow{\Delta H_4} X^-_{(g)} \left.\right\} \xrightarrow{\Delta H_5} Z$$

1) M^+X^-

2) $M^-X^-_{(s)}$

3) $M\ X$

4) $M^+X^-_{(g)}$

112. In the brown ring test, the brown colour of the ring is due to

1) ferrous nitrate

2) ferric nitrate

3) a mixture of NO and NO_2

4) nitrosoferrous sulphate

113. Amines behave as

1) Lewis acids

2) Lewis base

3) aprotic acid

4) neutral compound

114. Dalda is prepared from oils by

1) oxidation

2) reduction

3) hydrolysis

4) distillation

115. The chemical name of anisole is

1) Ethanoic acid

2) Methoxy benzene

3) Propanone

4) Acetone

116. The number of disulphide linkages present in insulin are

    1) 1   2) 2

    3) 3   4) 4

117. 80 g of oxygen contains as many atoms as in

    1) 80 g of hydrogen   2) 1 g of hydrogen

    3) 10 g of hydrogen   4) 5 g of hydrogen

118. Which metal has a greater tendency to form metal oxide ?

    1) Cr 2) Fe

    3) Al 4) Ca

119. Identify the reaction that does not take place in a blast furnace.

    1) $CaCO_3 \longrightarrow CaO + CO_2$ 2) $CaO + SiO_2 \longrightarrow CaSiO_3$

    3) $2Fe_2O_3 + 3C \longrightarrow 4Fe + 3CO_2$ 4) $CO_2 + C \longrightarrow 2CO$

120. Waxes are esters of

    1) glycerol
    2) long chain alcohols
    3) glycerol and fatty acid
    4) long chain alcohols and long chain fatty acids