

COMMON ENTRANCE TEST - 2008

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

MAXIMUM MARKS	TOTAL DURATION	MAXIMUM TIME FOR ANSWERING
120	150 MINUTES	140 MINUTES

MENTION YOUR CET NUMBER	QUESTION BOOKLET DETAILS	
	VERSION CODE	SERIAL NUMBER
	A - 1	147385

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 :



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

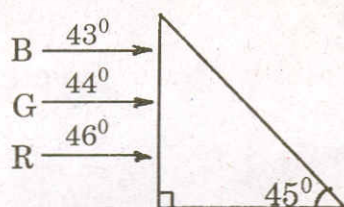
1. A ray of light enters from a rarer to a denser medium. The angle of incidence is i . Then the reflected and refracted rays are mutually perpendicular to each other. The critical angle for the pair of media is

- 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) $x + y \left(1 - \frac{1}{n}\right)$ 2) $x + ny$
 3) $x + y \left(1 + \frac{1}{n}\right)$ 4) $y + x \left(1 - \frac{1}{n}\right)$

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° , 44° and 43° respectively. The arrangement will separate

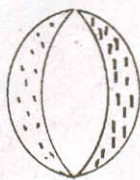


- 1) red colour from blue and green
 2) blue colour from red and green
 3) green colour from red and blue
 4) all the three colours.

4. A convex and a concave lens separated 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

(Space for Rough Work)

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

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° . The direction θ of the first secondary maximum is given by

1) $\sin^{-1} \frac{2}{3}$

2) $\sin^{-1} \frac{3}{4}$

3) $\sin^{-1} \frac{1}{4}$

4) $\tan^{-1} \frac{2}{3}$

10. Maximum diffraction takes place in a given slit for

1) γ -rays

2) ultraviolet light

3) infrared light

4) radio waves

(Space for Rough Work)

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) $\frac{1}{4\pi\epsilon_0} \left(\frac{q}{r} - \frac{q}{R} \right)$ | 2) $\frac{1}{4\pi\epsilon_0} \left(\frac{q}{R} - \frac{Q}{r} \right)$ |
| 3) $\frac{1}{4\pi\epsilon_0} \left(\frac{q}{r} - \frac{Q}{R} \right)$ | 4) $\frac{1}{4\pi\epsilon_0} \left(\frac{Q}{R} + \frac{q}{r} \right)$ |

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 |

(Space for Rough Work)

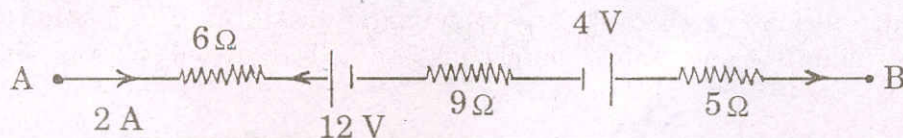
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- Diagram for Question 10: A circuit with a 2 V DC source in series with a $2\ \mu\text{F}$ capacitor. This series combination is connected in parallel with a branch containing a $6\ \mu\text{F}$ capacitor and a $3\ \mu\text{F}$ capacitor in series.

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20. The terminals of a 18 V battery with an internal resistance of $24\ \Omega$ are connected to a circular wire of resistance $24\ \Omega$ 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

Turn Over

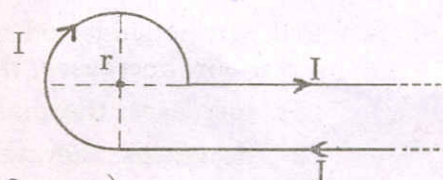
21. The potential difference between A and B in the following figure is



- 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_c . The magnetic field on its axis at a distance r from the centre is B_a . 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

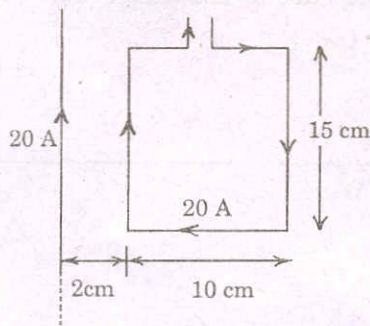


- 1) $\frac{\mu_0 I}{4\pi r} \left(\frac{3\pi}{2} + 1 \right)$
2) $\frac{\mu_0 I}{4\pi r} \left(\frac{3\pi}{2} - 1 \right)$
3) $\frac{\mu_0 I}{4\pi r} \left(\frac{\pi}{2} + 1 \right)$
4) $\frac{\mu_0 I}{4\pi r} \left(\frac{\pi}{2} - 1 \right)$

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° and 30° 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) $5 \times 10^{-4} N$

(Space for Rough Work)

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- Diagram for Problem 10: A series RLC circuit. The voltage across the resistor is $V_R = 80\text{ V}$, the voltage across the inductor is $V_L = 40\text{ V}$, and the voltage across the capacitor is $V_C = 100\text{ V}$. The AC source is labeled $E, 50\text{ Hz}$.

- (Space for Rough Work)

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

(Space for Rough Work)

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 $40 \text{ \AA}$. F_n is the nuclear force and F_e is the electrostatic force between them. Then
- 1) $F_n \gg F_e$
 - 2) $F_n = F_e$
 - 3) $F_n \ll F_e$
 - 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) $20 \times 10^{16} / s$

(Space for Rough Work)

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) $g\sqrt{t_1t_2}$

2) $\frac{gt_1t_2}{t_1+t_2}$

3) $\frac{g\sqrt{t_1t_2}}{2}$

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

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° 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

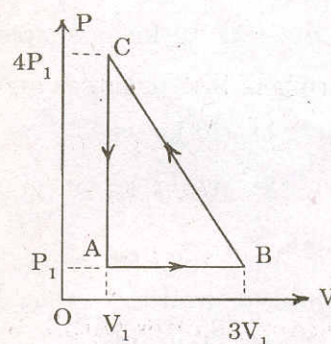
4) 8 N

(Space for Rough Work)

- 1) $2g$
- 2) $3g$
- 3) $4g$
- 4) g

- $$\begin{array}{ll} 1) \quad \gamma R & 2) \quad \frac{(\gamma-1)R}{\gamma} \\ 3) \quad \frac{R}{\gamma-1} & 4) \quad \frac{\gamma R}{\gamma-1} \end{array}$$

- 1) $3P_1V_1$
- 2) $-3P_1V_1$
- 3) $6P_1V_1$
- 4) zero



- | | |
|--------------|---------------|
| 1) Adiabatic | 2) Isochoric |
| 3) Isobaric | 4) Isothermal |

-
- Diagram of a composite rod of copper and steel. The copper part is 18 cm long and the steel part is 6 cm long. The total length is 24 cm. The left end is at 100°C and the right end is at 0°C.

- 1) 75°C
2) 67°C
3) 25°C
4) 33°C

SR - 33

- (Space for Rough Work)

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

(Space for Rough Work)

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

(Space for Rough Work)

- (Space for Rough Work)

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

(Space for Rough Work)

- (Space for Rough Work)

- (Space for Rough Work)

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 (O_2^-) 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

(Space for Rough Work)

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

(Space for Rough Work)

101. An ionic compound is expected to have tetrahedral structure if $\frac{r_+}{r_-}$ 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?

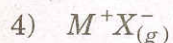
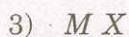
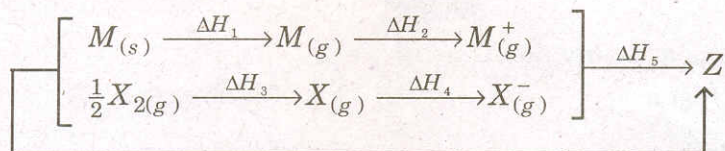
- | | |
|------------|--------------|
| 1) ethanol | 2) methanal |
| 3) ethanal | 4) propanone |

(Space for Rough Work)

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 Cottrell'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°C , it forms
- 1) Na_2CO_3
 - 2) NaHCO_3
 - 3) HCOONa
 - 4) CH_3COONa
109. $\text{N}_2 + 3\text{H}_2 \rightleftharpoons 2\text{NH}_3 + \text{heat}$. 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

(Space for Rough Work)

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



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

(Space for Rough Work)

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) $\text{CaCO}_3 \longrightarrow \text{CaO} + \text{CO}_2$
- 2) $\text{CaO} + \text{SiO}_2 \longrightarrow \text{CaSiO}_3$
- 3) $2\text{Fe}_2\text{O}_3 + 3\text{C} \longrightarrow 4\text{Fe} + 3\text{CO}_2$
- 4) $\text{CO}_2 + \text{C} \longrightarrow 2\text{CO}$

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

(Space for Rough Work)