

COMMON ENTRANCE TEST - 2007

DATE	SUBJECT	TIME
09 - 05 - 2007	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	370241

IMPORTANT INSTRUCTIONS TO CANDIDATES

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

1. Ensure that you have entered your Name and Register Number of 2nd PUC Annual Examination / 12th Std. in the space provided on the OMR answer sheet.
2. Ensure that CET No. has been entered and shaded the respective circles on the OMR answer sheet.
3. **ENSURE THAT THE TIMING, MARKS PRINTED ON THE OMR ANSWER SHEET ARE NOT DAMAGED/ MUTILATED/ SPOILED.**
4. This Question Booklet is issued to you by the invigilator after the 2nd Bell. i.e., after 10.00 a.m.
5. Enter the Serial Number of this question booklet on the OMR answer sheet.
6. Carefully enter the Version Code of this question booklet on the OMR answer sheet and SHADE the respective circles completely.
7. 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.
8. **DO NOT FORGET TO SIGN AT THE BOTTOM PORTION OF OMR ANSWER SHEET IN THE SPACE PROVIDED.**
9. Until the 3rd Bell is rung at 10.10 a.m. :
 - Do not remove the seal 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.
10. After the 3rd Bell is rung at 10.10 a.m., remove the seal present on the right hand side of this question booklet and start answering on the OMR answer sheet.
11. This question booklet contains 120 questions and each question will have four different options / choices.
12. 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 :



13. 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.
14. 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.
15. 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.
16. Hand over the OMR ANSWER SHEET to the room invigilator as it is.
17. After separating and retaining the top sheet (CET Cell Copy), the invigilator will return the bottom sheet replica (Candidate's copy) to you to carry home for self-evaluation.
18. Preserve the replica of the OMR answer sheet for a minimum period of One year.

PHYSICS

1. A ray of light is travelling from glass to air. (Refractive index of glass = 1.5) The angle of incidence is 50° . The deviation of the ray is

1) $\sin^{-1}\left[\frac{\sin 50^\circ}{1.5}\right] - 50^\circ$ 2) $50^\circ - \sin^{-1}\left[\frac{\sin 50^\circ}{1.5}\right]$

3) 80° 4) 0°

2. A vessel of height $2d$ is half filled with a liquid of refractive index $\sqrt{2}$ and the other half with a liquid of refractive index n . (The given liquids are immiscible). Then the apparent depth of the inner surface of the bottom of the vessel (neglecting the thickness of the bottom of the vessel) will be

1) $\frac{nd}{d + \sqrt{2n}}$ 2) $\frac{\sqrt{2n}}{d(n + \sqrt{2})}$

3) $\frac{d(n + \sqrt{2})}{n\sqrt{2}}$ 4) $\frac{n}{d(n + \sqrt{2})}$

3. A ray of light is incident normally on one face of a right angled isosceles prism. It then grazes the hypotenuse. The refractive index of the material of the prism is

1) 1.732 2) 1.5
3) 1.414 4) 1.33

4. Two thin equiconvex lenses each of focal length 0.2 m are placed coaxially with their optic centres 0.5 m apart. Then the focal length of the combination is

1) 0.1 m 2) -0.1 m
3) 0.4 m 4) -0.4 m

5. A prism of a certain angle deviates the red and blue rays by 8° and 12° respectively. Another prism of the same angle deviates the red and blue rays by 10° and 14° respectively. The prisms are small angled and made of different materials. The dispersive powers of the materials of the prisms are in the ratio

1) 11 : 9 2) 6 : 5
3) 9 : 11 4) 5 : 6

(Space for Rough Work)

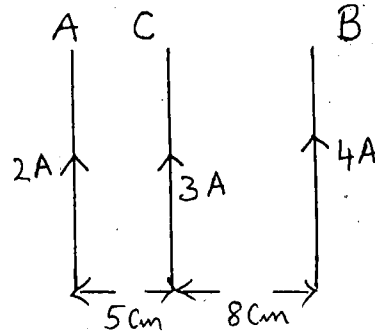
6. The electro magnetic theory of light failed to explain
- 1) Interference
 - 2) Diffraction
 - 3) Polarisation
 - 4) Photo electric effect
7. Light from two coherent sources of the same amplitude A and wavelength λ illuminates the screen. The intensity of the central maximum is I_0 . If the sources were incoherent, the intensity at the same point will be
- 1) $\frac{I_0}{2}$
 - 2) I_0
 - 3) $2I_0$
 - 4) $4I_0$
8. In Young's double slit experiment with sodium vapour lamp of wavelength 589 nm and the slits 0.589 mm apart, the half angular width of the central maximum is
- 1) $\text{Sin}^{-1}0.1$
 - 2) $\text{Sin}^{-1}0.001$
 - 3) $\text{Sin}^{-1}0.0001$
 - 4) $\text{Sin}^{-1}0.01$
9. A single slit Fraunhofer diffraction pattern is formed with white light. For what wavelength of light the third secondary maximum in the diffraction pattern coincides with the second secondary maximum in the pattern for red light of wavelength 6500 \AA ?
- 1) 9100 \AA
 - 2) 4642.8 \AA
 - 3) 4100 \AA
 - 4) 4400 \AA
10. The head lights of a jeep are 1.2 m apart. If the pupil of the eye of an observer has a diameter of 2 mm and light of wavelength 5896 \AA is used, what should be the maximum distance of the jeep from the observer if the two head lights are just separated?
- 1) 3.39 m
 - 2) 3.39 km
 - 3) 33.9 m
 - 4) 33.9 km

(Space for Rough Work)

11. When the angle of incidence is 60° on the surface of a glass slab, it is found that the reflected ray is completely polarised. The velocity of light in glass is
- 1) $3 \times 10^8 \text{ ms}^{-1}$ 2) $2 \times 10^8 \text{ ms}^{-1}$
3) $\sqrt{3} \times 10^8 \text{ ms}^{-1}$ 4) $\sqrt{2} \times 10^8 \text{ ms}^{-1}$
12. A 20 cm length of a certain solution causes right handed rotation of 38° . A 30 cm length of another solution causes left handed rotation of 24° . The optical rotation caused by 30 cm length of a mixture of the above solutions in the volume ratio 1 : 2 is
- 1) right handed rotation of 3° 2) left handed rotation of 3°
3) right handed rotation of 14° 4) left handed rotation of 14°
13. Two identical charges repel each other with a force equal to 10 mgwt when they are 0.6 m apart in air. ($g = 10 \text{ ms}^{-2}$) The value of each charge is
- 1) $2\mu\text{C}$ 2) 2nC
3) $2 \times 10^{-7} \text{ C}$ 4) 2mC
14. The potential of the electric field produced by a point charge at any point (x, y, z) is given by $V = 3x^2 + 5$, where x, y, z are in metres and V is in volts. The intensity of the electric field at $(-2, 1, 0)$ is
- 1) -12Vm^{-1} 2) $+12 \text{Vm}^{-1}$
3) -17Vm^{-1} 4) $+17 \text{Vm}^{-1}$
15. The potential of a large liquid drop when eight liquid drops are combined is 20V. Then the potential of each single drop was
- 1) 2.5 V 2) 5 V
3) 7.5 V 4) 10 V

(Space for Rough Work)

26. A and B are two infinitely long straight parallel conductors. C is another straight conductor of length 1 m kept parallel to A and B as shown in the figure. Then the force experienced by C is



- 1) towards B equal to $0.6 \times 10^{-5} N$
- 2) towards A equal to $5.4 \times 10^{-5} N$
- 3) towards B equal to $5.4 \times 10^{-5} N$
- 4) towards A equal to $0.6 \times 10^{-5} N$

27. An electric bulb has a rated power of 50 W at 100 V. If it is used on an a.c. source 200 V, 50 Hz, a choke has to be used in series with it. This choke should have an inductance of

- 1) 1.1 H
- 2) 0.1 H
- 3) 1 mH
- 4) 0.1 mH

28. An inductance of $\frac{200}{\pi}$ mH, a capacitance of $\frac{10^{-3}}{\pi}$ F and a resistance of 10Ω are connected in series with an a.c. source 220 V, 50 Hz. The phase angle of the circuit is

- 1) $\frac{\pi}{3}$
- 2) $\frac{\pi}{2}$
- 3) $\frac{\pi}{4}$
- 4) $\frac{\pi}{6}$

29. A stepdown transformer reduces the voltage of a transmission line from 2200 V to 220 V. The power delivered by it is 880 W and its efficiency is 88%. The input current is

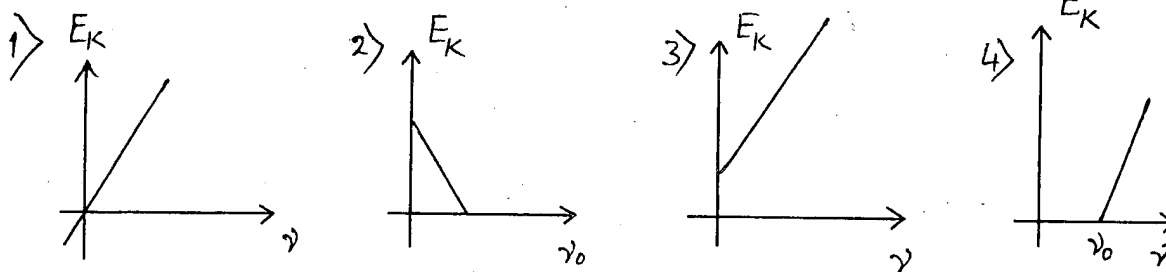
- 1) 4.65 A
- 2) 0.465 A
- 3) 0.0465 A
- 4) 4.65 mA

30. Current in a coil changes from 4 A to zero in 0.1 second and the emf induced is 100 V. The self inductance of the coil is

- 1) 4 H
- 2) 2.5 H
- 3) 0.4 H
- 4) 0.25 H

(Space for Rough Work)

31. All components of the electromagnetic spectrum in vacuum have the same
- 1) Frequency
 - 2) Wavelength
 - 3) Velocity
 - 4) Energy
32. Which one of the following graphs represents the variation of maximum kinetic energy (E_K) of the emitted electrons with frequency γ in photoelectric effect correctly ?



- 1) 1
- 2) 2
- 3) 3
- 4) 4

33. A and B are two metals with threshold frequencies 1.8×10^{14} Hz and 2.2×10^{14} Hz. Two identical photons of energy 0.825 eV each are incident on them. Then photoelectrons are emitted in
- 1) A alone
 - 2) B alone
 - 3) in both A and B
 - 4) in neither A nor B

(Take $h = 6.6 \times 10^{-34}$ Js)

34. The ionization energy of L_i^{++} is equal to
- 1) hcR
 - 2) $2 hcR$
 - 3) $6 hcR$
 - 4) $9 hcR$
35. Electrons in a certain energy level $n = n_1$, can emit 3 spectral lines. When they are in another energy level $n = n_2$. They can emit 6 spectral lines. The orbital speeds of the electrons in the two orbits are in the ratio
- 1) 1 : 2
 - 2) 2 : 1
 - 3) 3 : 4
 - 4) 4 : 3

(Space for Rough Work)

46. The dimensional formula for impulse is

1) $ML^{-1}T^{-1}$

2) $M^{-1}LT^{-1}$

3) $ML^{-1}T$

4) MLT^{-1}

47. The maximum height attained by a projectile when thrown at an angle θ with the horizontal is found to be half the horizontal range. Then $\theta =$

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

2) $\frac{\pi}{4}$

3) $\frac{\pi}{6}$

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

48. A shell of mass 20 kg at rest explodes into two fragments whose masses are in the ratio 2 : 3. The smaller fragment moves with a velocity of 6 ms^{-1} . The kinetic energy of the larger fragment is

1) 360 J

2) 144 J

3) 216 J

4) 96 J

49. Water rises in plant fibres due to

1) Osmosis

2) Fluid pressure

3) Viscosity

4) Capillarity

50. The acceleration due to gravity becomes $\left(\frac{g}{2}\right)$ where $g =$ acceleration due to gravity on the surface of the earth at a height equal to

1) $\frac{R}{2}$

2) $2R$

3) $\frac{R}{4}$

4) $4R$

(Space for Rough Work)

56. The maximum particle velocity in a wavemotion is half the wave velocity. Then the amplitude of the wave is equal to

1) λ

2) $\frac{\lambda}{2\pi}$

3) $\frac{2\lambda}{\pi}$

4) $\frac{\lambda}{4\pi}$

57. The ratio of the velocity of sound in hydrogen $\left(r = \frac{7}{5}\right)$ to that in helium $\left(r = \frac{5}{3}\right)$ at the same temperature is

1) $\frac{\sqrt{21}}{5}$

2) $\frac{\sqrt{42}}{5}$

3) $\sqrt{\frac{5}{21}}$

4) $\sqrt{\frac{5}{42}}$

58. An engine is moving towards a wall with a velocity 50 ms^{-1} emits a note of 1.2 kHz . Speed of sound in air = 350 ms^{-1} . The frequency of the note after reflection from the wall as heard by the driver of the engine is

1) 1.2 kHz

2) 1.6 kHz

3) 0.24 kHz

4) 2.4 kHz

59. A glass tube is open at both the ends. A tuning fork of frequency f resonates with the air column inside the tube. Now the tube is placed vertically inside water so that half the length of the tube is filled with water. Now the air column inside the tube is in unison with another fork of frequency f' . Then

1) $f' = \frac{f}{2}$

2) $f' = 2f$

3) $f' = 4f$

4) $f' = f$

60. The surface temperature of the Sun which has maximum energy emission at 500 nm is 6000 K . The temperature of a star which has maximum energy emission at 400 nm will be

1) 6500 K

2) 7500 K

3) 4500 K

4) 8500 K

(Space for Rough Work)

(Space for Rough Work)

CHEMISTRY

71. Mg^{2+} is isoelectronic with
- 1) Ca^{2+}
 - 2) Na^+
 - 3) Zn^{2+}
 - 4) Cu^{2+}
72. Gram molecular volume of oxygen at STP is -
- 1) 11200 cm^3
 - 2) 22400 cm^3
 - 3) 5600 cm^3
 - 4) 3200 cm^3
73. Presence of halogen in organic compounds can be detected using -
- 1) Beilstein's test
 - 2) Kjeldahl test
 - 3) Duma's test
 - 4) Leibig's test
74. The electronic configuration of Cr^{3+} is
- 1) $[Ar]3d^5 4s^1$
 - 2) $[Ar]3d^2 4s^1$
 - 3) $[Ar]3d^3 4s^0$
 - 4) $[Ar]3d^4 4s^2$
75. The mass of a metal, with equivalent mass 31.75, which would combine with 8 g of oxygen is
- 1) 31.75
 - 2) 3.175
 - 3) 8
 - 4) 1

(Space for Rough Work)

76. Benzene reacts with chlorine in sunlight to give a final product –
- 1) C_6H_5Cl
 - 2) C_6Cl_6
 - 3) $C_6H_6Cl_6$
 - 4) CCl_4
77. In the periodic table metals usually used as catalysts belong to
- 1) s - block
 - 2) p - block
 - 3) d - block
 - 4) f - block
78. Dalton's law of partial pressures is applicable to which one of the following systems ?
- 1) $CO + H_2$
 - 2) $H_2 + Cl_2$
 - 3) $NO + O_2$
 - 4) $NH_3 + HCl$
79. The general formula of a cycloalkane is
- 1) C_nH_{2n+2}
 - 2) C_nH_{2n-2}
 - 3) C_nH_{2n}
 - 4) C_nH_n
80. In acetylene molecule, between the carbon atoms there are –
- 1) three sigma bonds
 - 2) two sigma and one pi bonds
 - 3) one sigma and two pi bonds
 - 4) three pi bonds

(Space for Rough Work)

81. Denatured alcohol is
- 1) Rectified spirit
 - 2) Undistilled ethanol
 - 3) Rectified spirit + methanol + naphtha
 - 4) Ethanol + methanol
82. During the formation of a chemical bond
- 1) energy decreases
 - 2) energy increases
 - 3) energy of the system does not change
 - 4) electron-electron repulsion becomes more than the nucleus-electron attraction
83. One mole of oxygen at 273 k and one mole of sulphur dioxide at 546 k are taken in two separate containers, then,
- 1) kinetic energy of $O_2 >$ kinetic energy of SO_2 .
 - 2) kinetic energy of $O_2 <$ kinetic energy of SO_2 .
 - 3) kinetic energy of both are equal.
 - 4) None of these
84. +I effect is shown by
- | | |
|------------|------------|
| 1) $-NO_2$ | 2) $-Cl$ |
| 3) $-Br$ | 4) $-CH_3$ |
85. Formation of coloured solution is possible when metal ion in the compound contains
- | | |
|---------------------------|-----------------------|
| 1) paired electrons | 2) unpaired electrons |
| 3) lone pair of electrons | 4) none of these |

(Space for Rough Work)

86. Which of the following is an intensive property ?
- 1) temperature
 - 2) surface tension
 - 3) viscosity
 - 4) all of these
87. Hofmann's bromamide reaction is to convert
- 1) amine to amide
 - 2) amide to amine
 - 3) alcohol to acid
 - 4) acid to alcohol
88. IUPAC name of $Na_3[Co(NO_2)_6]$ is
- 1) sodium cobaltinitrite
 - 2) sodium hexanitrito cobaltate (III)
 - 3) sodium hexanitro cobalt (III)
 - 4) sodium hexanitrito cobaltate (II)
89. Thermodynamic standard conditions of temperature and pressure are
- 1) $0^\circ C$ and 1 atm
 - 2) 273 k and 101.3 k Pa
 - 3) 298 k and 1 atm
 - 4) $0^\circ C$ and 101.3 k Pa
90. How many chiral carbon atoms are present in 2, 3, 4 - trichloropentane ?
- 1) 3
 - 2) 2
 - 3) 1
 - 4) 4

(Space for Rough Work)

91. The number of unidentate ligands in the complex ion is called
- 1) EAN
 - 2) Coordination number
 - 3) primary valency
 - 4) oxidation number
92. $2SO_{2(g)} + O_{2(g)} \xrightleftharpoons{V_2O_5}$ is an example for
- 1) irreversible reaction
 - 2) heterogenous catalysis
 - 3) homogenous catalysis
 - 4) neutralisation reaction
93. The amino acid which is not optically active is
- 1) glycine
 - 2) alanine
 - 3) serine
 - 4) lactic acid
94. For a stable molecule the value of bond order must be
- 1) negative
 - 2) positive
 - 3) zero
 - 4) there is no relationship between stability and bond order.
95. Which one of the following is a second order reaction ?
- 1) $CH_3COOCH_3 + NaOH \longrightarrow CH_3COONa + H_2O$
 - 2) $H_2 + Cl_2 \xrightarrow{\text{sunlight}} 2HCl$
 - 3) $NH_4NO_3 \longrightarrow N_2 + 3H_2O$
 - 4) $H_2 + Br_2 \longrightarrow 2HBr$

(Space for Rough Work)

96. According to Bayer's strain theory which is highly stable ?
- 1) cyclohexane
 - 2) cycloheptane
 - 3) cyclopentane
 - 4) cyclobutane
97. The number of antibonding electron pairs in O_2^{2-} molecular ion on the basis of molecular orbital theory is
- [Note - Atomic number of O is 18]
- 1) 2
 - 2) 3
 - 3) 4
 - 4) 5
98. Hydroxyl ion concentration of 1M HCl is
- 1) $1 \times 10^{-14} \text{ mol dm}^{-3}$
 - 2) $1 \times 10^{-1} \text{ mol dm}^{-3}$
 - 3) $1 \times 10^{-13} \text{ mol dm}^{-3}$
 - 4) $1 \times 10^1 \text{ mol dm}^{-3}$
99. Geometrical isomerism is shown by
- 1) $-C-C-$
 - 2) $-C \equiv C-$
 - 3) $\begin{array}{c} \diagup \\ C = C \\ \diagdown \end{array}$
 - 4) None of these
100. The oxidation state of iron in $K_4[Fe(CN)_6]$ is
- 1) 2
 - 2) 3
 - 3) 4
 - 4) 1

(Space for Rough Work)

101. In which of the following process, a maximum increase in entropy is observed ?
- 1) dissolution of salt in water
 - 2) condensation of water
 - 3) sublimation of naphthalene
 - 4) melting of ice
102. Decomposition of benzene diozonium chloride by using Cu_2Cl_2/HCl to form chlorobenzene is
- 1) Cannizzaro's reaction
 - 2) Kolbe's reaction
 - 3) Sandmeyer's reaction
 - 4) Raschig's reaction
103. Which complex can not ionise in solution ?
- 1) $[Pt(NH_3)_6]Cl_4$
 - 2) $K_2[Pt(F_6)]$
 - 3) $K_4[Fe(CN)_6]$
 - 4) $[CoCl_3(NH_3)_3]$
104. Considering the reaction $C_{(s)} + O_{2(g)} \rightarrow CO_{2(g)} + 393.5 \text{ kJ}$ the signs of ΔH , ΔS and ΔG respectively are
- 1) -, +, -
 - 2) -, -, -
 - 3) -, +, +
 - 4) +, -, -
105. The product formed when hydroxylamine condenses with a carbonyl compound is called
- 1) hydrazone
 - 2) hydrazine
 - 3) oxime
 - 4) hydrazide

(Space for Rough Work)

106. Which of the following forms a colourless solution in aqueous medium?

- | | |
|--------------|--------------|
| 1) Ti^{3+} | 2) Sc^{3+} |
| 3) V^{3+} | 4) Cr^{3+} |

107. When a sulphur sol is evaporated sulphur is obtained. On mixing with water sulphur sol is not formed. The sol is

- | | |
|----------------|----------------|
| 1) hydrophilic | 2) hydrophobic |
| 3) reversible | 4) lyophilic |

108. An alkyl halide reacts with alcoholic ammonia in a sealed tube, the product formed will be

- | | |
|---------------------|-------------------------------|
| 1) a primary amine | 2) a secondary amine |
| 3) a tertiary amine | 4) a mixture of all the three |

109. When conc. H_2SO_4 is heated with P_2O_5 , the acid is converted into

- 1) sulphur
- 2) sulphur dioxide
- 3) sulphur trioxide
- 4) a mixture of sulphur dioxide and sulphur trioxide

110. Entropy of the universe is

- | | |
|----------------------------|----------------------------|
| 1) continuously increasing | 2) continuously decreasing |
| 3) zero | 4) constant |

(Space for Rough Work)

111. Which of the following salts on being dissolved in water gives $\text{pH} > 7$ at 25°C ?

- | | |
|---------------------------|---------------------------|
| 1) NH_4CN | 2) NH_4Cl |
| 3) KNO_3 | 4) KCN |

112. The reagent used in Clemmenson's reduction is

- | | |
|---------------------------------------|----------------------------------|
| 1) alc. KOH | 2) aq. KOH |
| 3) Zn-Hg / con. HCl | 4) Conc. H_2SO_4 |

113. When KBr is dissolved in water, K^+ ions are

- | | |
|---------------|-------------|
| 1) oxidised | 2) reduced |
| 3) hydrolysed | 4) hydrated |

114. The noble gas mixture is cooled in a coconut bulb at 173 K . The gases that are not adsorbed are

- | | |
|--------------------------------|--------------------------------|
| 1) He and Ne | 2) Ar and Kr |
| 3) He and Xe | 4) Ne and Xe |

115. The volume of 10N and 4N HCl required to make 1 litre of 7N HCl are

- 0.75 litre of 10N HCl and 0.25 litre of 4N HCl
- 0.80 litre of 10N HCl and 0.20 litre of 4N HCl
- 0.60 litre of 10N HCl and 0.40 litre of 4N HCl
- 0.50 litre of 10N HCl and 0.50 litre of 4N HCl

(Space for Rough Work)

116. A metal present in insulin is

- | | |
|-----------|--------------|
| 1) copper | 2) iron |
| 3) zinc | 4) aluminium |

117. Carbon forms two oxides which have different compositions. The equivalent mass of which remains constant ?

- | | |
|------------------------------|---------------------------|
| 1) carbon | 2) oxygen |
| 3) neither carbon nor oxygen | 4) both carbon and oxygen |

118. Maximum number of molecules of CH_3I that can react with a molecule of CH_3NH_2 are

- | | |
|------|------|
| 1) 1 | 2) 2 |
| 3) 4 | 4) 3 |

119. Ellingham diagram represents a graph of

- | | |
|----------------------|------------------------|
| 1) ΔG Vs T | 2) ΔG^0 Vs T |
| 3) ΔS Vs P | 4) ΔG Vs P |

120. Identify the ore not containing iron

- | | |
|------------------|---------------|
| 1) chalcopyrites | 2) carnallite |
| 3) siderite | 4) limonite |

(Space for Rough Work)

ΠΣ

A-1