

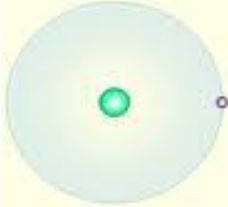
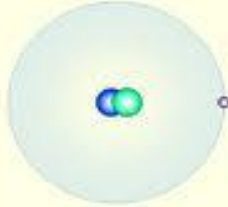
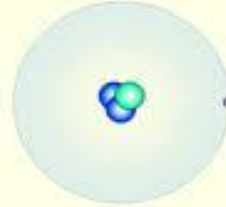
WINTER – 2012 EXAMINATION

Subject Code: 17103

Model Answer

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Basic Chemistry

Que. No.	Sub. Que.	Model Answer	Marks	Total Marks										
1.	a)	<p>Isotopes of hydrogen :</p> <div><div>${}_1\text{H}^1$ <p>hydrogen-1</p><p>1 proton 0 neutron 1 electron</p></div><div>${}_1\text{H}^2$ <p>hydrogen-2</p><p>1 proton 1 neutron 1 electron</p></div><div>${}_1\text{H}^3$ <p>hydrogen-3</p><p>1 proton 2 neutrons 1 electron</p></div></div>	2	2										
	b)	<p>Different sub levels with maximum number of electrons</p> <table><tr><th>Sub levels</th><th>Maximum electrons</th></tr><tr><td>s</td><td>2</td></tr><tr><td>p</td><td>6</td></tr><tr><td>d</td><td>10</td></tr><tr><td>f</td><td>14</td></tr></table>	Sub levels	Maximum electrons	s	2	p	6	d	10	f	14	<div>1/2</div> <div>1/2</div> <div>1/2</div> <div>1/2</div>	2
Sub levels	Maximum electrons													
s	2													
p	6													
d	10													
f	14													
	c)	<p>i) Valence electrons: The electrons present in the outermost (valence) shell of an atom are called valence electrons.</p> <p>ii) Atom: Atom is the smallest particle of an element which cannot be further sub-divided and which takes part in all chemical changes.”</p>	<div>1</div> <div>1</div>	2										
	d)	<p>Faraday’s First law:</p> <p>Statement: The Faraday’s 1st law states that, “The weight of substance deposited or liberated at an electrode during electrolysis is directly proportional to the quantity of electricity passed through its solution.</p>	<div>2</div>	2										
	e)	<p>Cathode: The electrode which is connected to negative terminal of the battery is called cathode.</p> <p>Electrolytic cell : It is device in which an electrical energy is used bring about a chemical changes OR</p> <p>It is an apparatus of convenient shape, size, material like glass or steel in which electrolysis is carried out.</p>	<div>1</div> <div>1</div>	2										



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1.	f)	i) At cathode, Cu metal is deposited. ii) At anode, O ₂ gas is evolved. iii) In electrolytic cell, colorless Sulphuric acid is formed.	2	2
	g)	Given: pH = 4.2596 [H ⁺] = ? Solution: pH = -log ₁₀ [H ⁺] 4.2596 = -log ₁₀ [H ⁺] [H ⁺] = antilog (-4.2596) [H ⁺] = 5.50 x 10 ⁻⁴ moles/ lit.	1/2 1/2 1/2 1/2	2
	h)	i) Gangue: Ore is associated with impurities like sand and clay; these unwanted impurities associated with the ores are known as gangue or matrix.	1	2
		ii) Ore: The mineral from which the metal is conveniently and economically extracted is known as ore .	1	
	i)	Purposes of Calcination: (consider any two) 1) To convert carbonates and hydroxide into oxides. $\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$ (Lime stone) Calcium oxide $\text{CuCO}_3 \cdot \text{Cu(OH)}_2 \rightarrow 2\text{CuO} + \text{CO}_2 + \text{H}_2\text{O}$ (Malachite) Copper oxide 2) To remove the moisture $\text{Fe}_2\text{O}_3 \cdot 3\text{H}_2\text{O} \rightarrow \text{Fe}_2\text{O}_3 + 3\text{H}_2\text{O}$ 3) To remove the volatile impurities. 4) To make the ore porous for easy reduction.	1 mark each	2



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1.	j)	Composition of Duralumin: Al : 95% Cu : 4% Mg: 0.5% Mn : 0.5%	2	2																		
	k)	Tack: Tack is the special property of rubber by virtue of which two or more surfaces can stick to each other. This property is used in making tyres of vehicles.	2	2																		
	l)	Uses of Thermocole: 1) As it has low coefficient of thermal and electrical expansion, it is used in refrigeration and air conditioning. 2) As it spongy, porous, strong, light in weight, it is used in packing of delicate instruments.	1 1	2																		
2.	a)	Distinction between Atomic number & atomic mass number. (any 4) <table border="1"><thead><tr><th>Sr. No.</th><th>Atomic Number (z)</th><th>Atomic mass no. (A)</th></tr></thead><tbody><tr><td>1)</td><td>The no. of protons in the nucleus is equal to the no. of electrons in extra nuclear part of an atom is called at. no. of an element. i.e. $Z = p = e$</td><td>The sum of protons & neutrons present in the nucleus of an atom of element is called at mass number of an element. i.e. $A = Z + n$</td></tr><tr><td>2)</td><td>Elements are placed in periodic table according to their at. number</td><td>Elements are not placed in periodic table as per at mass number.</td></tr><tr><td>3)</td><td>Different element have different atomic number e.g. ${}_2\text{He}^4$, ${}_1\text{H}^1$, ${}_6\text{C}^{12}$</td><td>Atoms of the same of different elements may or may not have the same at mass no.</td></tr><tr><td>4)</td><td>Chemical properties of an element depend on atomic no.</td><td>Chemical properties element are not depends on at mass no.</td></tr><tr><td>5)</td><td>At no. does not decide atomic weight of element.</td><td>At mass no. of element decide atomic weight of element.</td></tr></tbody></table>	Sr. No.	Atomic Number (z)	Atomic mass no. (A)	1)	The no. of protons in the nucleus is equal to the no. of electrons in extra nuclear part of an atom is called at. no. of an element. i.e. $Z = p = e$	The sum of protons & neutrons present in the nucleus of an atom of element is called at mass number of an element. i.e. $A = Z + n$	2)	Elements are placed in periodic table according to their at. number	Elements are not placed in periodic table as per at mass number.	3)	Different element have different atomic number e.g. ${}_2\text{He}^4$, ${}_1\text{H}^1$, ${}_6\text{C}^{12}$	Atoms of the same of different elements may or may not have the same at mass no.	4)	Chemical properties of an element depend on atomic no.	Chemical properties element are not depends on at mass no.	5)	At no. does not decide atomic weight of element.	At mass no. of element decide atomic weight of element.	1 mark each	4
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Basic Chemistry

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Basic Chemistry

Que. No.	Sub. Que.	Model Answer	Marks	Total Marks
3.	b)	<p>i) Hardness: It is a property which enables the material to resist penetration or abrasion or scratching by other materials.</p> <p>ii) Ductility: It is a property of a material which allows it to be drawn into wires.</p> <p>iii) Soldering: It is defined as a process of joining the metal surfaces by introducing a molten non –ferrous ally with melting point below 400°C between them is known as soldering.</p> <p>iv) Brazing : It is defined as a process of joining the metal surfaces by introducing a molten non –ferrous ally with melting point above 400°C between them is known as brazing.</p>	1 1 1 1	4
	c)	<p>Fusion method for preparation of alloys.</p> <p>In this method, metal having higher melting point is melted in silica crucible & then other elements of low melting points are added to it. After stirring we get a homogeneous mixture of these elements i.e. an alloy. This process is known as fusion.</p> <p>During fusion oxidation of molten mass is prevented by covering with fine charcoal powder. Alloys like brass, bronze are prepared by this fusion method.eg-brass, an alloy of copper & zinc is prepared as copper with melting pt. 1090°c & zinc melting point. 420°c. Copper is first melted in crucible & then zinc is added to this molten mass. After stirring homogeneous mixture of brass</p>	2	4
		<p>The diagram illustrates the fusion method for preparing alloys in two stages. In the first stage, 'Alloy components in proper proportions' are shown as small circles inside a 'Refractory lined crucible'. In the second stage, after 'Fusion', the components have melted into a 'Molten mixture'. A 'Carbon layer to avoid oxidation' is shown on top of the molten mixture. A 'Graphite rod for stirring molten mixture' is shown inserted into the mixture. The crucible is supported by a stand with a Bunsen burner underneath.</p>	2	



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3.	d)	Properties of plastics and corresponding engineering applications : (any 4) <table><tr><th>Sr. No.</th><th>Properties</th><th>Applications</th></tr><tr><td>1.</td><td>Low specific gravity and high tensile strength.</td><td>Air-craft, motor car, structural purpose</td></tr><tr><td>2.</td><td>In combination with metals.</td><td>Steering wheels of automobiles plastic covered dash board</td></tr><tr><td>3.</td><td>Low electrical conductivity and good corrosion resistance.</td><td>Electrical insulator, for giving coating on printed circuit in electrical circuit.</td></tr><tr><td>4.</td><td>Bad conductor of heat.</td><td>Handles for electric irons, soldering iron, for pans, pressure cookers etc.</td></tr><tr><td>5.</td><td>Water repelling e.g.- polystyrene refined with glass fibers.</td><td>End sections of condensers in electricity generating stations Tarpaulin.</td></tr><tr><td>6.</td><td>Clear transparent, translucent or opaque & can take up wide range of colors & has high decorative value.</td><td>Safety glass, windscreens for automobiles knobs for radios automobiles & household applications.</td></tr><tr><td>7.</td><td>Good adhesive property.</td><td>Adhesive for laminated wood products, synthetic paints & varnishes.</td></tr><tr><td>8.</td><td>High optical clarity & smoothness</td><td>Optical lenses</td></tr><tr><td>9.</td><td>Greater strength per unit weight, greater resistance to wear & tear. Hard & high shock absorbing capacity.</td><td>Timing gears, self-lubricating bearings, pulleys, etc. Noise & vibrations are reduced.</td></tr></table>	Sr. No.	Properties	Applications	1.	Low specific gravity and high tensile strength.	Air-craft, motor car, structural purpose	2.	In combination with metals.	Steering wheels of automobiles plastic covered dash board	3.	Low electrical conductivity and good corrosion resistance.	Electrical insulator, for giving coating on printed circuit in electrical circuit.	4.	Bad conductor of heat.	Handles for electric irons, soldering iron, for pans, pressure cookers etc.	5.	Water repelling e.g.- polystyrene refined with glass fibers.	End sections of condensers in electricity generating stations Tarpaulin.	6.	Clear transparent, translucent or opaque & can take up wide range of colors & has high decorative value.	Safety glass, windscreens for automobiles knobs for radios automobiles & household applications.	7.	Good adhesive property.	Adhesive for laminated wood products, synthetic paints & varnishes.	8.	High optical clarity & smoothness	Optical lenses	9.	Greater strength per unit weight, greater resistance to wear & tear. Hard & high shock absorbing capacity.	Timing gears, self-lubricating bearings, pulleys, etc. Noise & vibrations are reduced.	1 mark each	4
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3.	e)	<p>Drawbacks of natural rubber : (any three)</p> <ol style="list-style-type: none"> 1. It has low strength, hardness and toughness. 2. It has large water absorbing capacity. 3. It is non resistant to non polar solvents. 4. It is attacked by oxidizing agents. 5. During summer, the raw rubber becomes soft & sticky while in cold weather it becomes hard & brittle. 6. It is too weak to be used in heavy duty operation. 7. On stretching, it undergoes permanent deformation. <p>Vulcanization is the process that increases the stiffness of natural rubber.</p>	3 1	4
	f)	<p>Thermal insulators: The substances having extremely low conductivity which prevent the loss of heat by conduction or radiation are called insulators. E.g.- Glass wool.</p> <p>Uses of glass wool:- (consider any three)</p> <ol style="list-style-type: none"> 1. It is used for insulation against heat of house domestic applications such as ovens refrigerators, etc. 2. It is also used for insulating steam metal pipe lines in industry. 3. As it has great resistance to chemicals used as a filter for filtering corrosive liquids. 4. It is used as a dust filter in vehicle machines 5. It is used for electrical insulation and for sound proofing. 6. It is used as a shock absorber in chemical equipments. e.g.-Victors Meyer's apparatus. 	1 1 mark each	4