Khulna University of Engineering & Technology
Department of Industrial Engineering and Management
B.Sc. Engineering 1st Year 1st Term Examination, 2015

IPE 1101

Manufacturing Process-I

Full Marks: 210 Time: 3 hrs

N.B: *i) Answer any THREE questions from each section in separate scripts.*
ii) Figures in the right margin indicate full marks.
iii) Assume reasonable data if missing any.

SECTION–A

1.	(a)	What is manufacturing process? Write the classification of manufacturing process with example.	11
	(b)	What is casting? Draw a flow chart in a typical sand casting operation.	12
	(c)	What are the functions of core and riser? Mention the essential properties of a good core.	12
2.	(a)	Give a step by step procedure for the following processes: i) Die casting ii) Lost foam casting	12
	(b)	What is pattern? Briefly explain the tapper allowance and chamfer allowance with neat sketches.	10
	(c)	List the name of molding sand and briefly describe each.	13
3.	(a)	Write down the advantages and limitations of squeeze casting process and shell mold casting process.	10
	(b)	Mention the causes and remedies of the following sand casting defects: i) Blow holes ii) Hot tears iii) Missruns	13
	(c)	Briefly explain the true centrifugal casting process. What are the basic differences between true and semi-centrifugal casting?	12
4.	(a)	Briefly describe the injection molding and blow molding process for plastic product manufacturing.	18
	(b)	Briefly describe the extrusion molding process with net sketch.	12
	(c)	Why is injection molding process capable of producing complex parts?	05

SECTION–B

5.	(a)	What is welding? What are the four conditions required for an ideal metallurgical bond?	05
	(b)	Describe deferent types of flame used in oxyacetylene gas welding with net sketch.	10
	(c)	Describe oxygen torch cutting process briefly with net sketch. Also mention the advantages and limitations of oxygen torch cutting process.	20
6.	(a)	What is the basic difference between SMAW and SAW? Discuss SMAW process with figure.	15
	(b)	Write short notes on the following welding process: i) Plasma arc welding ii) Stud welding	11
	(c)	Mention the main differences between TIG and MIG with necessary sketches.	09
7.	(a)	What is resistance spot welding? Explain with a simple sketch.	12
	(b)	What measures can be taken to reduce the resistance between the electrode and workpieces?	08
	(c)	Mention the main advantages of soldering as a joining process. How does soldering differ from brazing? What is braze welding?	15
8.	(a)	Define thermit welding. Name the common types of thermit welding process and describe any one of them with net sketch.	15
	(b)	Define i) Roll gap ii) Neutral point iii) Craft in rolling process with necessary figures.	09
	(c)	Explain the features of different types of rolling mills with necessary sketches.	11

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CHEM 1111

Chemistry

Full Marks: 210 Time: 3 hrs

N.B: *i) Answer any THREE questions from each section in separate scripts.*
ii) Figures in the right margin indicate full marks.
iii) Assume reasonable data if missing any.

SECTION–A

1.	(a)	What is electroplating? How pure gold can be separated impure gold with the help of electrolysis?	10
	(b)	What is Lithium-ion battery? Discuss the drawbacks of the present Lithium-ion battery.	08
	(c)	What is calomel electrode? Discuss the emf method for the measurement of PH of a solution.	10
	(d)	Deduce expression for the emf of a concentration cell at 45°c.	07
2.	(a)	What do you mean by rate law, order of reaction and energy of activation?	09
	(b)	Deduce the expression for the rate constant of a third order reaction considering the same reactants molecules.	09
	(c)	What is activated complex? The initial concentration of NH_3 is 0.75 moles per litre. Calculate the time required in seconds for 80% completion of the following reaction, where is 50% completed in 35 minutes. $2NH_3 \rightarrow N_2 + 3H_2$	09
	(d)	What do you mean by steady state approximation?	08
3.	(a)	Explain "Specific Conductance" and "Equivalent Conductance"?	08
	(b)	Deduce thermodynamically the reaction between the emf of a galvanic cell and heat of reaction in the cell.	12
	(c)	Calculate the value of "C" from the following cell at 37°c, if the emf of the cell is 0.112 volts. $Sn/Sn^{++}(0.12\ M)\| Fe^{+++}(C)/Fe$ [The standard electrode potential of Sn and Fe are 0.12 and 0.036 volts respectively]	10
	(d)	What gas electrode?	05
4.	(a)	What is transport number? Describe Hittorf's method for the measurement of transport number of Ag^+ and NO_3^- $AgNO_3$ solution.	15
	(b)	The resistance of a N/15 solution of a salt in found to be 2.60×10^3 ohms. Calculate the equivalent conductance of the solution. [Cell constant=1.14 cm^{-1}]	08
	(c)	Explain the following: i) Gold number ii) Electrophorus iii) Salt Bridge and its use.	12

SECTION–B

5.	(a)	Explain CFT for octahedral fields.	12
	(b)	"$[Co(H_2O)_6]Cl_2$ is used as invisible ink"-Explain?	10
	(c)	Magnetic moment, μ of $K_3[Fe(CN)_6]$ is 1.84 BM. Calculate the number of unpaired electrons of the central metal atom of complex?	07
	(d)	What is EAN rule?	06
6.	(a)	Discuss about intermolecular and intramolecular H-bonding. What is called H-bond donor and H-bond accepter?	10
	(b)	Explain the bond theory of metals in terms of Na?	10
	(c)	What is called chelate effect? What are the stability factors of chelate compounds?	10
	(d)	What is silicate? Write down the name of different type of silicate.	05
7.	(a)	What is called congruent and incongruent melting point? Which system shows utectic point? Determine the degrees of freedom at utectic point?	10
	(b)	Discuss the phase diagram of two component system having congruent melting point?	12
	(c)	$[Ti(H_2O)_6]^{3+}$ absorbs radiation at 520nm. Calculate the Δ_o for.this complex?	07
	(d)	What is triple point? Discuss about the triple point H_2O system.	06
8.	(a)	Deduce Longmuir adsorption isotherm and discuss this equation for the limiting conditions of very low and very high pressure.	10
	(b)	What is emulsion? Discuss one method for the preparation of emulsion.	10
	(c)	What is zeta potential? Write down the principle postulates of Stern's theory of electric double layer.	10