

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-1/T-2 B. Sc. Engineering Examinations 2012-2013

Sub : **CHE 111** (Elements of Chemical Engineering)

Full Marks : 210

Time : 3 Hours

The figures in the margin indicate full marks.

**A booklet containing all relevant data to be supplied.****USE SEPARATE SCRIPTS FOR EACH SECTION****SECTION - A**There are **FOUR** questions in this Section. Answer any **THREE** questions:

1. (a) In 1916 Nusselt derived a theoretical equation for predicting the coefficient of heat transfer between a pure saturated vapor and a colder surface: (10)

$$h = 0.943 \left( \frac{k^3 \rho^2 g \lambda}{L \mu \Delta T} \right)^{1/4}$$

Where h = heat transfer coefficient, Btu/(hr).(ft<sup>2</sup>)(Δ°F)

K = thermal conductivity, Btu/(hr). (ft).(Δ°F)

ρ = density, lb/ft<sup>3</sup>g = acceleration of gravity, ft/hr<sup>2</sup>

λ = heat of vaporization, Btu/lb

L = length of tube, ft

μ = viscosity, lb<sub>m</sub>/hr.ft

ΔT = temperature difference, Δ°F

What is the unit of the constant : 0.943?

- (b) Two variables, x and y are related as

$$y = \sqrt{ax + \frac{b}{x}}$$

Suggest how you will find the parameter values a and b from experimental data of x and y. (10)

(c) A gas mixture contains 5 mass% hydrogen, 20 mass% ethane (C<sub>2</sub>H<sub>6</sub>), 25 mass% ethylene (C<sub>2</sub>H<sub>4</sub>), 30 mass% carbon dioxide (CO<sub>2</sub>) and the rest is water vapor. The gas mixture is passed through a dessicator which removes only and all of the water vapor.

Find the molar composition of the dry gas. (15)

2. (a) Vapor pressure of a substance is given by  $p_{sat} \left( \frac{lb_f}{ft^2} \right) = 16.35 + 40.6t$  (°F). Write the

expression for  $p_{sat}$  in Pascal and in terms of t (°C). (7)

(b) Write a short account on the different types of fluid flow rate measuring devices. (15)

(c) A manufacturer of briquets has a contract to make briquets for barbecuing that are guaranteed not to contain over 10% moisture and not over 10% ash. The basic material they use has the analysis : moisture 12.4%, volatile materials 16.6%, carbon 57.5%,

Contd ..... P/2

**CHE 111****Contd ... Q. No. 2(b)**

and ash 13.5%. To meet the specification they plan to mix with the base material a certain amount of petroleum coke that has the analysis: volatile material 8.2%, carbon 88.7%, and moisture 3.1%. How much petroleum coke must be added per 100 kg of the base material?

**(13)**

3. (a) The reaction between ethylene and hydrogen bromide is carried out in a continuous reactor. The product stream is analyzed and found to contain 51.7 mole%  $C_2H_5Br$  and 17.3 mole%  $HBr$ . The feed to the reactor contains only ethylene and hydrogen bromide. Calculate the fractional conversion of the limiting reactant and the percentage by which the other reactant is in excess.

**(15)**

(b) A power company operates one of its boilers on natural gas and another on oil. The analyses of the fuels show 96%  $CH_4$ , 2%  $C_2H_2$ , and 2%  $CO_2$  for the natural gas and  $C_nH_{1.8n}$  for the oil. The flue gases from both units enter the same stack. The stack-gas analysis shows 10.0%  $CO_2$ , 0.63%  $CO$ , 4.55%  $O_2$ , and the rest is  $N_2$  on dry basis. What percentage of the total carbon burned comes from the oil?

**(20)**

4. (a) An evaporation-crystallization process is used to obtain solid potassium sulfate from an aqueous solution of this salt. The fresh feed to the process contains 19.6 wt%  $K_2SO_4$ . The wet filter cake consists of solid  $K_2SO_4$  crystals and a 40.0 wt%  $K_2SO_4$  solution, in a ratio 10 kg crystals/kg solution. The filtrate, also a 40.0 wt% solution, is recycled to join the fresh feed. Of the water fed to the evaporator, 45% is evaporated.

If the evaporation rate is 200 kg water/min, calculate the production rate of solid  $K_2SO_4$  and the ratio kg recycle/kg fresh feed.

**(23)**

(b) A gas mixture containing 80%  $C_2H_6$  and 20%  $O_2$  is burned with 200% excess air. Eighty percent of the ethane goes to  $CO_2$ , 10% goes to  $CO$ , and 10% remains unburned.

Calculate the composition of the flue gas.

**(12)****SECTION – B**

There are **FOUR** questions in this Section. Answer any **THREE**.

5. (a) If ice at  $-10^\circ C$  and 1 atm is heated to produce steam at  $250^\circ C$  and 4 atm, how much energy is needed to produce such 1 kg steam? Show the hypothetical process path and all calculation steps clearly. List assumptions (if any).

**(15)**

(b) A natural gas containing 85 wt% methane and balance ethane. One thousand cubic meters per hour of this gas at  $50^\circ C$  and 1.1 bar is to be burned with 20% excess air. The air flow meter is calibrated to read the volumetric flow rate at standard temperature and pressure (STP). Draw and completely label the flow chart. What should the meter read (in SCMH) when the air flow rate is set to the desired value? What is the density of this natural gas?

**(20)**

**CHE 111**

6. (a) An equimolar mixture of benzene and toluene at 20°C is fed continuously to a flash separator resulting in two product streams - one is liquid and the other is vapor. They are in equilibrium at 60°C. The liquid product contains 45 mole% benzene and the vapor product has 65 mole% benzene. How much heat must be transferred to or from the separator per 100 mole of feed? Neglect the effect of pressure on the enthalpy. (20)

(b) A saturated steam at  $T_1$ °C and 7.0 bar is combined with a superheated steam at  $T_2$ °C and 20 bar in a ratio of 1. The product steam is at 300°C and 7 bar. The process operates adiabatically at steady state. Calculate the temperatures  $T_1$  and  $T_2$ . (15)

7. (a) A continuous rotary dryer is used to dry wet wood chips. The dryer operates at 1 atm pressure. The wet chips containing 42 wt% water enter the dryer at 20°C and when leave the dryer the moisture content must be less than 10%. Hot dry air at 100°C is fed to the dryer. The dry bulb temperature of the exiting air is found to be 38°C and the wet bulb temperature is 30°C. The air exits from the dryer at a rate of 14 m<sup>3</sup>/kg of wet chips entering the dryer. Psychrometric chart is provided in Figure for Q. 7(a). (26)

- (i) Draw a block diagram of the process and completely label it.
- (ii) Calculate the moisture content of the exiting chips and check whether it meets the design specification, i.e., the moisture content is less than 10%.
- (iii) If the dryer is operating adiabatically, what is the exit temperature of the dry chips Given: Specific heat of bone dry wood chips is 2 kJ/(kg°C), specific heat of liquid water is 4.18 kJ/(kg °C) and the molecular weight of air 29. Show all steps clearly (include input-output table).

(b) In the context of Psychrometric chart explain the following: (9)

- (i) Wet bulb temperature
- (ii) Humid volume
- (iii) Enthalpy deviation.

8. Natural gas containing 90 mole% methane and the balance ethane is burned completely with 20% excess air in a furnace. The stack gas leaves the furnace at 1000°C and is cooled to 450°C in a waste heat boiler, a heat exchanger in which heat lost by cooling gases is used to produce steam from liquid water for heating, power generation, or process applications. (35)

(a) Taking a basis of calculation 100 mol of the natural gas fed to the furnace, calculate the amount of heat (kJ) that must be transferred from the gas in the waste heat boiler to accomplish the indicated cooling (Show all steps clearly - draw a process flow diagram, label it completely, prepare an input-output enthalpy table, calculate unknown enthalpies and perform the energy balance)

**CHE 111**

**Contd ... Q. No. 8**

- (b) How much saturated at 60 bar can be produced from boiler feedwater at 40°C for the same basis of calculation? (Assume that all the heat transferred from the gas goes into the steam production).
- (c) At what rate (kmol/s) must fuel gas be burned to produce 1500 kg steam per hour in the waste heat boiler? What is the volumetric flow rate (m<sup>3</sup>/h) of the gas leaving the boiler?
- (d) Briefly explain how the waste heat boiler contributes to the plant profitability.
-

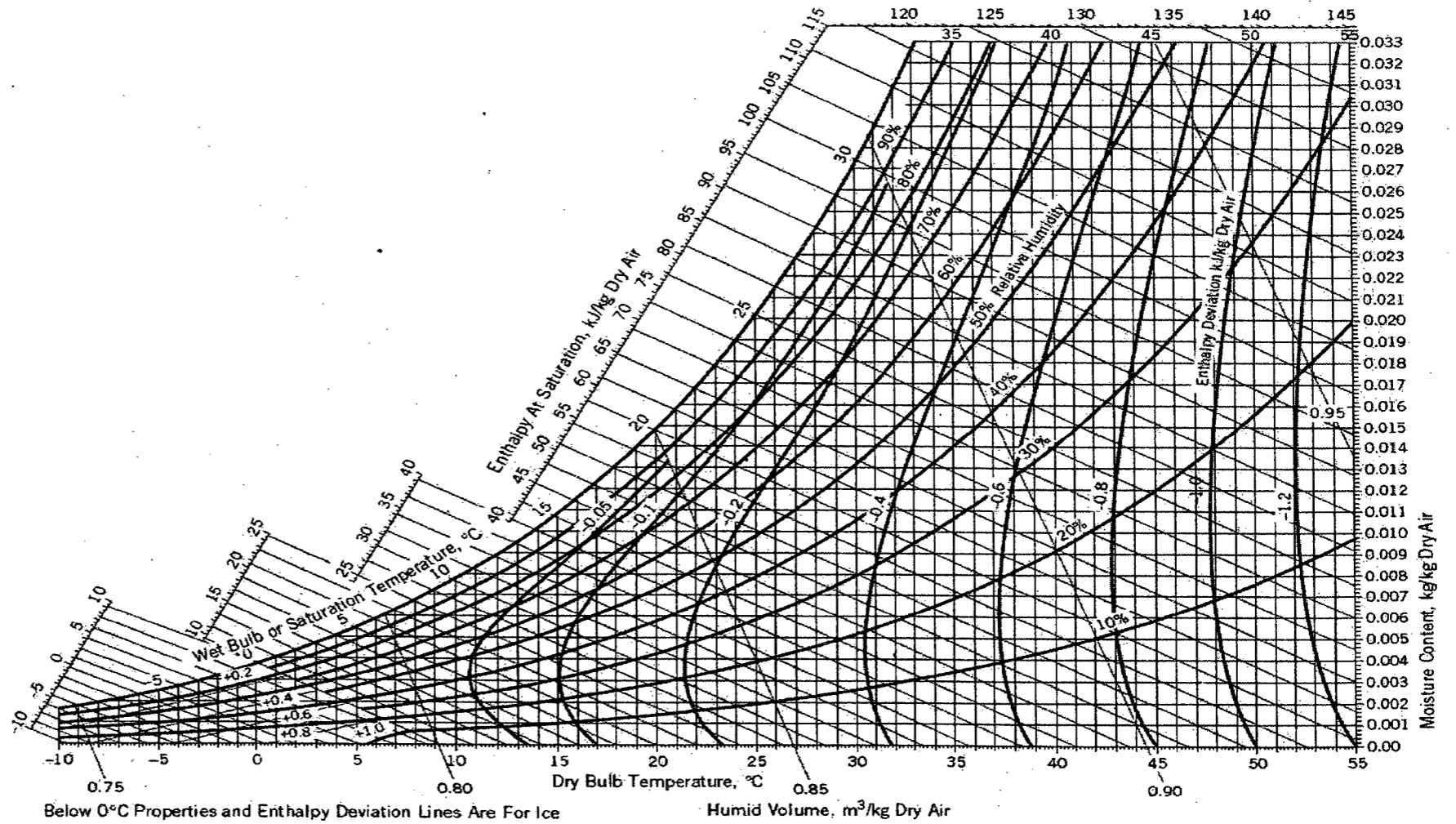


Figure 8.4-1 Psychrometric chart—SI units. Reference states: H<sub>2</sub>O (L, 0°C, 1 atm), dry air (0°C, 1 atm). (Reprinted with permission of Carrier Corporation.)

Figure for Q 7(a)

51

**SECTION - A**

There are **FOUR** questions in this Section. Answer any **THREE**.

1. (a) What are electric dipole and electric quadrupole? Derive an expression for electric field strength due to an electric dipole at a point on the perpendicular bisector of the dipole. (15)  
 (b) Show that the electric field at a point between two similar but oppositely charged plates is constant but zero outside the plates. (12)  
 (c) Two charges  $+2\mu\text{C}$  and  $-2\mu\text{C}$  are placed at the corners of the base of an equilateral triangle. The length of a side of the triangle is 80 cm. Find the electric field intensity at the apex of the triangle. (8)
  
2. (a) Distinguish between electric potential energy and electric potential. Find the relation between the electric potential at a point due to quadrupole and quadrupole moment of the charge distribution. (17)  
 (b) Derive an expression for Gauss's law as applied to a dielectric. (12)  
 (c) A 50 V DC power supply is used to charge two capacitors in parallel, one of the capacitors is  $3\mu\text{F}$  and the other is  $5\mu\text{F}$ . What energy is stored in the capacitors? (6)
  
3. (a) State and explain Lenz's law. A solenoid is wound on an iron core of relative permeability  $\mu_r$ . Calculate the inductance per unit length of the solenoid. (12)  
 (b) A circuit contains an inductance  $L$  and a resistance  $R$  connected in series with a cell of emf  $\epsilon$ . Explain the growth and decay of current in the circuit. What is the time constant of the circuit? (17)  
 (c) A coil of 200 turns and area  $0.2\text{ m}^2$  is placed normally in a magnetic field. The magnetic field changes from  $0.2\text{ wb m}^{-2}$  to  $0.8\text{ wb m}^{-2}$  at a uniform rate over a period of 0.03 s. Calculate the induced emf in the coil. (6)
  
4. (a) Show that the expression for the change in wavelength of a photon undergoing Compton scattering is,  $\lambda' - \lambda = \frac{h}{m_0 c} (1 - \cos \phi)$ , where the terms have their usual meaning. (20)  
 (b) Write short notes on: (9)
  - (i) Photo-electric work function
  - (ii) Threshold frequency
  - (iii) Stopping potential
  
- (c) An electron has a kinetic energy of 2.5 eV. Calculate the de Broglie wavelength of the electron? (6)

**PHY 155(CHE)**

**SECTION - B**

There are **FOUR** questions in this Section. Answer any **THREE**.

5. (a) State Hubble's law. (5)
- (b) What do you mean by Doppler Effect in light? Find expressions of observed frequency of light in the case of longitudinal Doppler Effect. (20)
- (c) Twin Jabeen makes a round trip at  $0.6c$  to a star 12 light-years away from earth, while twin Rukh stays on the earth. Each twin sends the other a radio signal once a year from their own frame. How many signals does Jabeen receive? How many does Rukh receive? (10)
6. (a) What is mean life of a radioactive substance? Show what mean life of a radioactive substance,  $\tau = 1/\lambda$ , where  $\lambda$  is radioactive decay constant. (15)
- (b) Why electron can't reside inside the nucleus? (10)
- (c) Estimate the age of earth from the relative abundance of the two isotopes of Uranium,  $U^{235}$  and  $U^{238}$ . Given that half life of  $U^{235} = 7.07 \times 10^8$  years and half life of  $U^{238} = 4.5 \times 10^9$  years. (10)
7. (a) Define -(i) Lattice, (ii) Basis, (iii) Unit cell, (iv) Translation vector in crystallography. (8)
- (b) What is packing factor? Find the packing factor for a simple cubic and a body center cubic crystal. (12)
- (c) Describe CsCl structure. How does it differ from a standard simple cubic structure? (10)
- (d) Find the intercepts of y and z-axes if a plane (132) cuts an intercept of  $1.42 \text{ \AA}$  along the x axis of an orthorhombic cell. Consider the primitive translations of the cell as  $a = 1.42 \text{ \AA}$ ,  $b = 3.12 \text{ \AA}$  and  $c = 2.28 \text{ \AA}$ . (5)
8. (a) Derive Bragg's law of x-ray diffraction. Explain - "Why normal light cannot be used in diffraction pattern analysis of crystal?" (18)
- (b) Write short notes on - (12)
- (i) Covalent bond
- (ii) P-type semiconductor
- (iii) Edge dislocation
- (c) The Madelung constant of sodium chloride (NaCl) structure is 1.748 and the ions of opposite signs are separated by a distance  $2.82 \text{ \AA}$  in the structure. If the ionization energy of Na is 5.14 eV, electron affinity of Cl is 3.61 eV and  $n = 9$ , calculate the cohesive energy of a NaCl crystal. (5)
-

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-1/T-2 B. Sc. Engineering Examinations 2012-2013

Sub : **CHEM 131** (Physical Chemistry-I)

Full Marks : 210

Time : 3 Hours

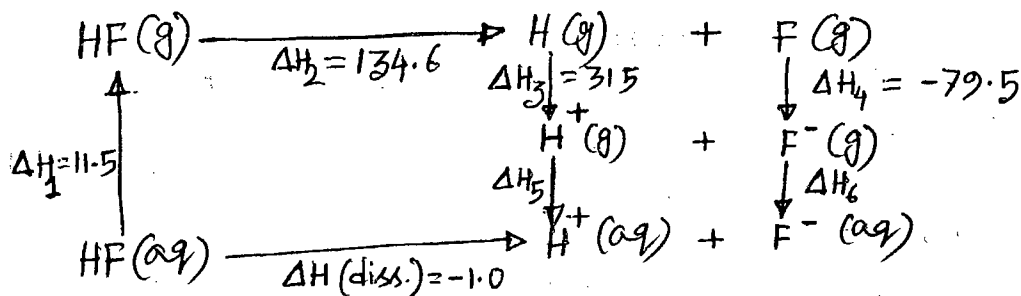
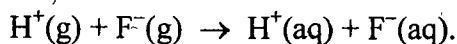
The figures in the margin indicate full marks.

USE SEPARATE SCRIPTS FOR EACH SECTION

**SECTION - A**There are **FOUR** questions in this Section. Answer any **THREE**.

Assume reasonable value for any missing data.

1. (a) Are the "Internal Energy" and the "Work" state functions? Justify your answer. (8)
- (b) Show that the change in internal energy ( $\Delta E$ ) is equal to the heat absorbed at constant volume and the change in enthalpy ( $\Delta H$ ) is equal to the heat absorbed at constant pressure. For the following change show the relationship between  $\Delta E$  and  $\Delta H$ .  
 $aA + bB = cC + dD$  (all the species are at gaseous state) (10)
- (c) How are the physical states influence the heat changes in chemical reactions? Discuss them with suitable examples. (9)
- (d) From the following transformations, calculate  $\Delta H$  for the change, (8)

All  $\Delta H$  values are in kcal/mol.

2. (a) Why is it necessary to have the second law of thermodynamics? Discuss, what should be the nature of the second law of thermodynamics and how the law should be stated? (10)
- (b) Justify why the combination,  $\frac{DQ}{T}$  has been chosen to define entropy. (10)
- (c) Prove that the change in entropy is independent of path and is a thermodynamic property. (15)
3. (a) 'Free energy 'G' for a system at constant temperature and pressure may decrease or remain constant but never increases' - justify the statement. (8)



**CHEM 131(CHE)**

**Contd ... Q. No. 3**

- (b) How is change in free energy related with the changes in entropy and enthalpy? Establish the condition for a reaction to occur spontaneously considering all the three state functions. (11)
- (c) The transformation,  $\text{SO}_2(\text{s}) \rightarrow \text{SO}_2(\text{l})$  occurs at  $-76^\circ\text{C}$ . Comment on the spontaneity of the transformation. (given: heat of fusion of  $\text{SO}_2$  is 1769 cal/mol). (5)
- (d) Deduce a relationship between the standard free energy change with the equilibrium constant of a chemical reaction,  $a\text{A} + b\text{B} = c\text{C} + d\text{D}$ . (11)
4. (a) State and explain the law of mass action. (5)
- (b) Define the term 'equilibrium constant'. What are the characteristic features of thermodynamic equilibrium constant? (5)
- (c) At 2000 K the standard free energy change for the reaction,  $\text{N}_2 + \text{O}_2 \rightleftharpoons 2\text{NO}$  is given by  $\Delta G^\circ = 92048 - 10.46 \times T$  J. Calculate  $k_p$  for the reaction at the same temperature. (10)
- (d) Derive an expression for the variation of equilibrium constant with temperature. (15)

**SECTION - B**

There are **FOUR** questions in this Section. Answer any **THREE**.

5. (a) What is Emulsion? Discuss the role played by an emulsifier in the process of emulsification. (2+5=7)
- (b) What is coagulation and peptization? Give suitable examples and discuss the role of electrolyte on coagulation. (4+5=9)
- (c) Explain electrophoresis, electro-osmosis, streaming potential and dorn effect. (12)
- (d) How colloid can be prepared by electrical disintegration method? (7)
6. (a) What is Henry's law? Explain the law in terms of the kinetic molecular theory of gases. Give an exception to Henry's law. (3+6+1=10)
- (b) How jam and jelly are preserved? Explain in the light of osmotic pressure. (7)
- (c) Predict the relative solubilities in the following cases: (i)  $\text{Br}_2$  in water and in Benzene (ii)  $\text{KCl}$  in  $\text{CCl}_4$  and in liquid  $\text{NH}_3$  (iii)  $\text{CH}_2\text{O}$  in  $\text{CS}_2$  and in water. (6)
- (d) Ethylene glycol,  $\text{CH}_2(\text{OH})\text{CH}_2(\text{OH})$ , is a common automobile antifreeze. It is water solute and fairly non volatile (bp  $197^\circ\text{C}$ ). Calculate the freezing point of a solution containing 724 g of this substance in 2603 g of water. Would you keep this substance in your car radiator during the summer? The value of the constant,  $k_f = 1.86^\circ\text{C}/\text{m}$ . (12)

**CHEM 131(CHE)**

7. (a) What is Zeta potential? What is the effect of electrolyte concentration on Zeta potential? (3+7=10)
- (b) Discuss the characteristic differences between lyophobic and lyophilic colloids. (10)
- (c) What is meant by buffer solution? How is it prepared? (6)
- (d) Calculate the  $p^H$  of  $1.0 \times 10^{-8}$  M solution of HCl. (9)
8. (a) State and explain Nernst distribution law. What are the merits and demerits of the law? (6)
- (b) How is the distribution law modified when the solute undergoes association in one of the solvents? (9)
- (c) Derive a general equation for the amount of substance left unextracted and the volume of the extracting liquid used each time. (10)
- (d) Given that the fraction of unextracted solute remaining after n times extractions is given by  $f_n = \left(1 + k_d \frac{V'}{V}\right)^{-n}$
- where  $V'$  is the volume of the extracting liquid and  $V$  is the volume containing the unextracted solute. Find n for 99.4% extraction of the solute having  $k_d = 10$  using equal volume of solvent in each case. (10)
-

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-1/T-2 B. Sc. Engineering Examinations 2012-2013

Sub : **MATH 123** (Integral Calculus and Differential Equations)

Full Marks : 210

Time : 3 Hours

The figures in the margin indicate full marks.

USE SEPARATE SCRIPTS FOR EACH SECTION

**SECTION – A**There are **FOUR** questions in this Section. Answer any **THREE**.

Symbols used have their usual meaning.

1. Evaluate:

$$(a) \int \frac{x^2}{(x \sin x + \cos x)^2} dx. \quad (11)$$

$$(b) \int \frac{1}{(1+x)\sqrt{1-x^2}} dx. \quad (12)$$

$$(c) \int e^{-\frac{x}{2}} \frac{\sqrt{1-\sin x}}{1+\cos x} dx. \quad (12)$$

$$2. (a) \text{ Evaluate : } \lim_{n \rightarrow \infty} \frac{1}{n} \left[ \sin^{2k} \left( \frac{\pi}{2n} \right) + \sin^{2k} \left( \frac{2\pi}{2n} \right) + \sin^{2k} \left( \frac{3\pi}{2n} \right) + \dots + \sin^{2k} \left( \frac{\pi}{2} \right) \right]. \quad (11)$$

$$(b) \text{ Find the value of } \int_0^{\frac{\pi}{2}} \frac{\sin^2 x}{1 + \cos x \sin x} dx. \quad (12)$$

$$(c) \int_0^{\frac{\pi}{4}} \ln(1 + \tan x) dx = \frac{\pi}{8} \ln 2. \quad (12)$$

$$3. (a) \text{ Prove that } \int_0^{\frac{\pi}{2}} \sin^m x \cos^n x dx = \frac{\Gamma\left(\frac{m+1}{2}\right) \Gamma\left(\frac{n+1}{2}\right)}{2\Gamma\left(\frac{m+n+2}{2}\right)}. \quad (11)$$

$$(b) \text{ Show that the improper integral } \int_0^{\infty} \frac{x}{(1+x)^3} dx = \frac{1}{2}. \quad (11)$$

$$(c) \text{ Show that } \int_0^1 x^5 \sqrt{\frac{1+x^2}{1-x^2}} dx = \frac{\pi}{8} + \frac{1}{3}. \quad (13)$$

$$4. (a) \text{ Determine the area within the curve } y^2(2a-x) = x^3 \text{ and its asymptote.} \quad (11)$$

$$(b) \text{ Find the area of a loop of } r = a \cos 2\theta \text{ and hence find the total area of all the loops.} \quad (12)$$

$$(c) \text{ Find the volume of the solid generated by revolving } \left(\frac{x}{a}\right)^{\frac{2}{3}} + \left(\frac{y}{b}\right)^{\frac{2}{3}} = 1 \text{ about x-axis.} \quad (12)$$

**MATH 123(CHE)****SECTION - B**

There are **FOUR** questions in this Section. Answer any **THREE**.

5. (a) Form the differential equation of the least order by eliminating arbitrary constants  $a, b, c$  from  $y = a + b \ln x + c(\ln x) + 3x^2$ . (11)

(b) Solve the differential equation  $(2x - 5y + 3)dx - (2x + 4y - 6)dy = 0$ . (12)

(c) Solve the initial value problem  $(2xy + 3y^2)dx - (2xy + x^2)dy = 0$  Subject to  $y(1) = 1$ . (12)

6. (a) Find an integrating factor of the differential equation  $\frac{dy}{dx} + x \sin 2y = x^3 \cos^2 y$ .

Hence obtain the solution of this differential equation. (13)

(b) A large tank is filled to capacity with 500 gallons of pure water. Brine containing 2 pounds of salt per gallon is pumped into the tank at a rate of 5 gallon per minute. The well-mixed solution is pumped out at the same rate. Find the number  $A(t)$  of pounds of salt in the tank at time  $t > 0$ . (10)

(c) Solve the following differential equation by inverse operator method:

$$\frac{d^2 y}{dx^2} - 6 \frac{dy}{dx} + 13y = e^{3x} \cos 4x. \quad (12)$$

7. (a) Solve the differential equation  $\frac{d^2 y}{dx^2} + 3 \frac{dy}{dx} + 2y = \frac{1}{1 + e^x}$  by the method of variation of parameters. (12)

(b) Solve the differential equation  $x^2 \frac{d^2 y}{dx^2} - 3x \frac{dy}{dx} + 5y = x^2 \cos(\ln x)$ . (12)

(c) A circuit has in series an electromotive force given by  $E = 100 \sin 60t$  volts, a resistor of 2 ohms, an inductor of 0.1 Henry and a capacitor of  $\frac{1}{260}$  farads. If the initial current and the initial charge on the capacitor are both zero, find the charge on the capacitor at any time  $t > 0$ . (11)

8. (a) Solve the differential equation  $\frac{d^2 y}{dx^2} - 9 \frac{dy}{dx} + 14y = 3x^2 - 5 \cos 2x + 7xe^{6x}$  by the method of undetermined coefficients. (12)

(b) Solve:  $y \frac{d^2 y}{dx^2} - \left( \frac{dy}{dx} \right)^2 = y^2 \ln y$ . (10)

(c) Solve the differential equation  $[(x+2)D^2 - (2x+5)D + 2]y = (x+1)e^x$  by the method of factorization of operators. (13)

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-1/T-2 B. Sc. Engineering Examinations 2012-2013

Sub : **HUM 125** (English)

Full Marks : 140

Time : 3 Hours

The figures in the margin indicate full marks.

USE SEPARATE SCRIPTS FOR EACH SECTION

**SECTION – A**There are **FOUR** questions in this Section. Answer **Q. No. 1** and any other **TWO** from the rest.

1. Read the following passage carefully and answer the questions that follow:

It is surely discreditable, under the age of thirty, not to be shy. Self-assurance in the young betokens a lack of sensibility; the boy or girl who is not shy at twenty-two will at forty-two become a bore. 'I may be wrong, of course'- thus will he or she gabble at forty-two, but what I always say is ...

No, let us educate the younger generation to be shy in and out of season, to edge behind the furniture; to say spasmodic and ill - digested things; to twist their feet around the protective feet of sofas and armchairs; to feel their hands belong to someone else - that they are objects, which they long to put down on some table away from themselves.

For shyness is the protective fluid within which our personalities are able to develop into natural shapes. Without this fluid the character becomes merely standardized or imitative! It is within the tender velvet sheath of shyness that the full flower of idiosyncrasy is matured, it is from this sheath alone that it can eventually unfold itself, coloured and undamaged. Let the shy understand, therefore, that their disability is not merely an inconvenience, but also a privilege. Let them regard their shyness as a gift rather than shyness as an affliction. Let them consider how intolerable are those of their contemporaries who are not also shy.

**(30)**

Questions:

- (i) What are the arguments given in favour of shyness?
- (ii) What kind of person is a boy or girl who is not shy?
- (iii) How do shy boys and girls generally behave?
- (iv) What has the writer to say to the shy to their benefit?
- (v) What is your own idea about shyness of the younger generation?
- (vi) Write down the meanings of the following words as used in the passage:

Betokens, gabble, spasmodic, idiosyncrasy, affliction.

2. (a) As the chief Engineer of a Chemical Engineering firm write a letter to the Manager of another firm requesting for the price lists of newly launched products. **(10)**

- (b) Give phonetic transcriptions of the following words. (Any five) **(10)**

About, colonel, school, wonder, private, extra.

## HUM 125(CHE)

3. (a) Write a dialogue between two students of Che.E departments on celebrating Chemical Day Festival. (10)
- (b) Write a short essay on any one of the following topics. (10)
- (i) Living with integrity
  - (ii) Thanks giving : A way of showing Gratitude.
  - (iii) Internation Terrorism: Facts or fallacy
4. (a) Transform the following sentences as directed. (any five) (10)
- (i) Make haste or else you will be late (Simple)
  - (ii) Against the wishes of his family he left school. (Complex)
  - (iii) When I went there I found him absent. (Simple)
  - (iv) In my sleep last night I dreamt a pleasant dream. (Compound)
  - (v) This is the venue of the meeting. (Complex)
  - (vi) Being tired, he fell asleep (Compound)
- (b) Write short notes on any two of the following: (10)
- (i) Elements of structure of a formal report
  - (ii) Impure vowels
  - (iii) Avoidances in Dialogue writing

### SECTION - B

There are **FOUR** questions in this Section. Answer **Q. No. 5** and any **TWO** from the rest.

5. (a) Explain with reference to the context any one of the following. (8)
- (i) "How singular is life, and how full of changes! How small a thing will ruin or save one!"
  - (ii) "The geniuses of all ages and all lands speak different languages, but the same flame burns in them all".
- (b) Answer any one of the following: (10)
- (i) Who according to you won the bet? Justify your answer according to the story of 'The Bet'.
  - (ii) 'Circe's Garden' is a story of conflict between good and evil in which evil is defeated. - Discuss.
- (c) Answer any three of the following: (12)
- (i) Describe the things that the lawyer was not allowed to do during his imprisonment.
  - (ii) How did the lawyer spend the last two years of his confinement?
  - (iii) Why had Mrs. Matilda Loisel been always unhappy?
  - (iv) What did the Loisel couple decide to do when they found the necklace nowhere?
  - (v) Give a description of the castle of Circe.

**HUM 125(CHE)**

6. Recast and correct any ten of the following sentences. (20)

- (i) Walt Whitman occupies a most unique place in literature.
- (ii) The jury is arguing among itself.
- (iii) Both of the mouse is underfed.
- (iv) It's a long way home.
- (v) This is the case what I want.
- (vi) It is the Robinsons whom, I feel certain, are to come
- (vii) It was me whom you saw yesterday.
- (viii) Abraham Lincoln was one the greatest man in American history.
- (ix) If Mary was here now, she would show you how to cook.
- (x) He is something better today.
- (xi) He didn't speak but once.
- (xii) This box is more square than that one.

7. (a) Give the meaning of any ten of the following words: (10)

Alleviate, blandishment, cabal, diffidence, eradicate, exorbitant, grievance, hilarious, indictment, menace, rancor, sleet.

(b) Make sentences with any ten of the following words: (10)

Beckon, concoct, exasperate, grouchy, limpid, oasis, pauper, recluse, sinuous, traverse, vestige, yelp.

8. Write a précis of the following passage with a suitable title. (20)

A vital success of any business is the right selection of its administrative staff. In this matter, management has the inescapable function not only of making the right selection, but after having made it, also of providing the fullest scope for legitimate ambition and individual advancement. A management which is so petty as to be jealous of the powers and authority of the officers will naturally select staff of the submissive type, docile men who are accustomed to obeying without question. It would not take the risk of engaging able and independent-minded employees for the fear that it may one day be supplanted by them. A really go-ahead management which understands the mood of the present times will do the direct opposite. It will seek out men capable of evolving policies within their own sphere and will train them to rise to the highest position. In connection with most administrative bodies, management is self-perpetuating and is responsible for its own succession. Even the ablest management cannot foresee the future with certainty; its decision, for the future, are at best intelligent guesses. What, however, it can and must do is to make available the enterprise to the men who will be capable of taking the decisions of the future and who are qualified, trained and tested during the present to do so. No management can rely upon a constant supply of geniuses. It must so train its staff that, during normal times, the enterprise is capable of being run effectively by men of not much more than average ability and with a robust sense of purpose.

-----