Total No. of Printed Pages:02

SUBJECT CODE NO:- P-22
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E.(CHEM) Examination May/June 2017
Process Dynamics and Control
(Revised)

[Time: Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B i) Q.No.1 and 06 are compulsory.
ii) Answer any other two questions from remaining of each of section.
iii) Assume suitable data if required.

Section A

Q.1 Assume following terms (any five). 10
(a) transfer function
(b) Impulse forcing function
(c) Damping coefficients
(d) Time constant for first order system.
(e) Gain of process
(f) Feedback control mechanism

Q.2 (a) Derive transfer function for non-interacting systems consisting of two tanks. List suitable assumptions. 08

(b) What do you mean by pure capacitive system? Why it has sluggish response? 07

Q.3 (a) Derive transfer function for second order system considering an example of U-tube manometer. 08

(b) A thermometer having time constant 0.1 minutes is placed in a temperature bath at 100^0C & allowed to come to equilibrium with bath. At time t=0 temperature of bath begins to vary sinusoidally about its average temp. 100^0C with amplitude of 2^0C.If frequency of oscillation is $10/\pi$ cycles per minute. Plot ultimate response of Thermometer reading as function of time also find phase lag. 07

Q.4 (a) Explain concept of mathematical model for chemical processes with its need. 05

(b) The transfer function of second order system is given as. 10

$G(S)=\frac{5}{2S^2+1.63S+5}$

A step change of magnitude 5 is given to input variables of system. Determine overshoot; rise time and maximum value of response.

Q.5 Write note on:- 15
(a) Mercury bulb thermometer and its transfer function.
(b) Transportation lag
(c) Concept of linearization

Section B

Q.6 Answer following terms. (Any five). 10
(a) Block diagram reduction
(b) Offset value
(c) Cross over frequency
(d) Break away point
(e) Statement of Bode stability criteria
(f) Regulator control problem.

Q.7 (a) Explain different hardware components of Feedback control system. 08

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(b) Calculate the value of offset for control system with proportions controller and with servo control mechanism. 07

Q.8 Sketch root locus diagram for control system whose open loop transfer function is. 15

G(s)=$\frac{K_c(1+4S)0.5S}{(s+1)(s+0.5)(s+2)(s+3)}$

Q.9 (a) Sketch bode plot for non-interacting system consisting of two tanks in series with respective time constants are T_1=1 min and T_2=2 min. 10

(b) Explain in detail phase margin and gain margin. 05

Q.10 Write note on:- 15

(a) Cascade control system

(b) Ziegler-Nicolas controller settings.

(c) Routh stability criteria

Total No. of Printed Pages:02

SUBJECT CODE NO:- P-23
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E.(CHEM) Examination May/June 2017
Chemical Reaction Engg. II
[OLD]

[Time: Three Hours] **[Max.Marks:100]**

Please check whether you have got the right question paper.

N.B i) Answer any three questions from each section.
ii) Assume suitable data, if required and draw neat sketches whenever needed.

Section A

Q.1 Explain following terms:-
(i) Conversion from tracer information 06
(ii) Stimulus-response technique to find RTD in reactors 05
(iii) Earliness and lateness of mixing 05

Q.2 (a) Explain in detail with graphical representation the E,C, F curve. Also derive the relationship among them. 10
(b) Discuss in detail Kunni and Levenspill flow model. 06

Q.3 For diffusion through ash layer controlling derive equation for relation, for time required and conversion, assuming un-reacted core model for spherical particles of unchanging size. Also find time required for complete conversion. 16

Q.4 A feed consisting 30% of 50-µm-radius particles 40% of 100-µm-radius particle 30% of 200-µm-radius particles is to be fed continuously in a thin layer onto a moving grate crosscurrent to a flow of reactant gas. For the planned operating conditions the time required for complete conversion is 5,10 and 20 min for the three sizes of particles. Find the conversion of solids on the grate for a residence time of 8 min in the reactor. 16

Q.5 Write note on:- 18
(a)Hydrodynamic flow model
(b) Determine rate controlling step in fluid-particle reaction
(c) Optimum temperature progression.

Section B

Q.6 Explain following terms:-
(a) Adsorption isotherm 05
(b) Catalyst deactivation 05
(c) Global rate of reaction 06

Q.7 Discuss in brief about slurry reactor reaction kinetics. 16

Q.8 The following kinetic data on the reaction A gives R are obtained in an experimental packed bed reactor using various amount of catalyst and a fixed feed rate F_{A0}=10 Kmol/hr. 16

W Kg of Cat	1	2	3	4	5	6	7	8
X_A	0.12	0.2	0.27	0.33	0.39	0.43	0.47	0.51

(a) Find the reaction rate at 40% conversion.
(b) In designing a large packed bed reactor with feed rate F_{A0}=400 kmol/hr how much catalyst would be needed for 40% conversion.
(c) How much catalyst would be needed in part (b) if the reactor employed a very large recycle of product stream?

Q.9 (a) Explain in detail Thiele modulus and effectiveness factor for porous catalysts. 10
(b) How will you prepare catalyst? 06

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Q.10 Write note on:- 18

(i) BET method

(ii) Steps in heterogeneous catalytic reaction.

(iii) Contacting pattern for fluid-fluid reaction.

Total No. of Printed Pages:2

SUBJECT CODE NO:- P-56
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E.(CHEM) Examination May/June 2017
Process equipment Design & Drawing- II
(Revised)

[Time: Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B i)Solve one question from Section A.
ii)Solve any two question from Section B.
iii)Assume suitable data, is necessary & state it clearly. Steam Table & Heat mass transfer data book are allowed.
iv)Answer with neat sketches will give weightage.

Section A

Q.1 Design a suitable heat exchanger for the given duty. Gas oil at 200°c is to be cooled at 40°c.The flow rate is 22,500kg/hr. cooling water is available at 30°c and the temperature rise is allowed to 20°c. The pressure drop allowance for each stream is 100kN/m^2, F_t=0.94 40

physical properties of water:-

Temperature,°c	30	40	50
C_p,KJ/Kg°c	4.18	4.18	4.18
K,Kw/m°c	$618x10^{-6}$	$631x10^{-6}$	$643x10^{-6}$
μ,mN/m^2s^{-1}	$797x10^{-3}$	$671x10^{-3}$	$544x10^{-3}$
ρ, Kg/m^3	995.2	992.8	990.1

Physical properties of gas oil:-

Temperature ,°c	200	120	40
C_p,KJ/Kg°c	2.59	2.28	1.97
K,Kw/m°c	0.13	0.125	0.12
μ,mNs/m^2	0.06	0.17	0.28
ρ, Kg/m^3	830	850	870

For cooling water υ=500w/m^2 ^{0}c , use steel tube of OD=20mm ID=16mm, 4m long triangular pitch $1.25d_0$

Water tube side $h_i = \frac{4200(1.35+0.02t)ut^{0.8}}{d_i^{0.2}}$

For shell side

$h_i = \frac{4200(1.35+0.02t)ut^{0.8}}{d_e^{0.2}}$

4 passes $D_b = d_0\left(\frac{N}{K}\right)^{\frac{1}{n}}$

K=0.175 , n=2.285

Clearance 92mm, 25% cut baffle , baffle spacing =133mm

$A_s = \frac{(P_t - d_0)D_s l_b}{P_t}$

$d_e = \frac{4\left[\left(\frac{P_t}{2}.0.8\right)P_t - \frac{1}{2}\pi\frac{d_0^2}{4}\right]}{\pi\frac{d_o}{2}}$

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$R_e = \frac{G_s d_e}{\mu}$

$\Delta P_s = 8 j_f \left(\frac{D_s}{d_e}\right)\left(\frac{L}{l_b}\right)\ \frac{\rho \mu_s{}^2}{2}\ \ \left(\frac{\mu}{\mu_w}\right)^{-0.14}$

$\Delta P_t = N_p\left[8 j_f\ \ \left(\frac{L}{d_i}\right)\ \left(\frac{\mu}{\mu_w}\right)^{-0.14}\frac{\rho \mu_t{}^2}{2}\right]$

Q.2 Design a double pipe heat exchanger. It is desine to heat 1.25kg/s of cold benzene flowing through inner pipe from 27°c to 50°c using hot toluene which is cooled from 70°c to 35°c. The specific gravity are 0.88 & 0.87 for benzene & toluene. The fouling factor of 1.76×10^{-4} w/m^{2}k should be provided for . Allowed pressure drop of 70kN/m^2. Find the surface area require & No of hair pins. If length of each hair pin 6m & inner pipe jacketed of 5.5m of hair pin. 40

At average temp of benzene & toluene.

Property	Benzene	Toluene
C_p,KJ/Kg °c	1780	1840
K,w/m^2 ^{0}c	0.157	0.147
μ,SI unit	5×10^{-4}	0.41×10^{-3}

Outer pipe OD=60mm inner pipe OD=24mm thickness of both pipe =3.5mm, k=45w/m^2 °c

Benzene inner side, Toluene outer side

$J_n = \frac{0.027}{(R_e)^{0.2}}$, $\frac{h_D}{K} = J_h R_e P_r^{0.33}$

Section B

Q.3 Design the following equipment 20
i)Evaporator
ii)Crystallizer

Q.4 Explain the following in detail 20
i)Design of rotary dryer
ii)Fouling in heat exchanger
iii)Pipe sizing for gases
iv)Factors for piping lay out & design
v)Jacketed vessel

Q.5 Sketch & design tray tower. 20

Total No. of Printed Pages:02

SUBJECT CODE NO:- P-87
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E.(CHEM) Examination May/June 2017
Transport Phenomena
(Revised)

[Time: Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B i) Q No.1 and Q. No. 6 are compulsory.
ii) Answer any two each from remaining sections each
iii) Assume suitable data if required.

Section A

Q.1	(a)	State the equation of motion?	03
	(b)	Define total time derivative?	03
	(c)	What is the effect of temperature on thermal conductivity of liquids?	04
Q.2	(a)	The distance between two plates is 0.5 cm & $\Delta Vx = 10\ cm/sec$. The fluid is ethyl alcohol at 273^0K having a viscosity of 0.15 kg/m sec. Calculate :- (a) Stream on each plate (b) The fluid velocity at $\frac{1}{2}$ inch intervals from plate to plate.	10
	(b)	Explain the eyring model?	05
Q.3		Obtain Hagen-Poiseuille equation for laminar flow of incompressible fluid in a circular tube. Summarize the assumption made while deriving the equation?	15
Q.4		A thick walled cylindrical tubing of hard rubber having an inside radius of 5 mm and an outside radius of 20mm is being used as temporary cooling coil in bath. Ice water is flowing rapidly inside and the inside wall temperature is 274.9 K. The outside surface temperature is 297.1 K. A total of 14.65 W heat must be removed from the bath by cooling coil. How many meters of tubing are needed? The thermal conductivity is 0.151 W/m.k.	15
Q.5		Write notes on:- (a) Mechanism of momentum transport (b) Equations of change for isothermal systems. (c) Convective transport of energy.	15

Section B

Q.6	Define the following:- (a) Fick's law (b) Convection (c) Analogy (d) Boundary conditions (e) diffusivity	10
Q.7	Explain the analogy of interphase transport with momentum transport? Give an example.	15
Q.8	Calculate D_{AB} for the methane-ethane system at 104^0F and 1 atm. Using following methods:- (a) Slattery equation (b) Chapman-Enskog theoretical equation.	15

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Using critical pressure and temperature to estimate Lennard-Jones parameters.

Data: $\Omega_{D,AB} = 1.45$, a=2.745× 10^{-4}, b=1.823.

Compound	M	T_C	P_C
Methane (A)	16.04	190.7	45.8
Ethane (B)	30.07	282.4	50.0

Q.9 A large tank filled with a mixture of CH_4 and air is connected with second tank filled with a different composition of CH_4 and air. Both tanks are at 100 KN/m^2 and 0^0C.The connection between the tanks is a tube of I.D 2mm and length of 150 mm. Calculate the steady state rate of transport of CH_4 through the tube when the concentration of CH_4 is 90% (Mole) in one tank and 5% (mole) in the other. Assume that transport is by molecular diffusion. 15

Data: D_{AB}=1.57× 10^{-5} m^2/sec (at 0^0C and 100 KN/m^2)

Q.10 Write notes on:- 15

(a) Diffusion through a stagnant film.

(b) Maxwell-Stefan equation.

(c) Heat conduction through a composite wall.

Total No. of Printed Pages:1

SUBJECT CODE NO:- P-119
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E.(Chem) Examination May/June 2017
Industrial Safety and Management
(Revised)

[Time: Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B i) Q. No.01 and 06 are compulsory.
ii) Answer any two questions from remaining of each section.
iii) Assume suitable data, if required and draw neat sketches wherever needed.

Section A

Q.1	Explain following terms i. Types of accidents and damages. ii. Workmen compensation Act.	 05 05
Q.2	Discuss in details Role of Safety in process industries	15
Q.3	With neat sketches explain different types of PPE.	15
Q.4	a. How will you analyze different types of Hazards? b. What is Role of HAZOP in Chemical Industries?	08 07
Q.5	Write short note on i. Event trees and Fault trees ii. Citizen Safety Rules. iii. Fire and Explosion.	15

SECTION – B

Q.6	Explain following terms i. Immaturity Theory ii. Predicting Future Behavior	 05 05
Q.7	Discuss in detail Major Process decisions and their impact	15
Q.8	What are key factors in Industrial Management, Explain in detail?	15
Q.9	What are skills required for Manager to run plant successfully.	15
Q.10	Write note on i. Motivation Hygiene Theory. ii. Vertical Integration. iii. Changing Behavior	15

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Total No. of Printed Pages:1

SUBJECT CODE NO:- P-180
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E.(Chem) Examination May/June 2017
Elective-I: Biochemical Engineering
(Revised)

[Time: Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B i) Q. No.1 and Q. No.6 are compulsory.
ii) Answer any two from remaining in each section.
iii) Draw neat sketches where required.
iv) State clearly any assumptions made.

Section A

Q.1 Define the following 10
(a) DNA (b) Enzyme deactivation (c) Yield factor (d) Zygote (e) Chromosome

Q.2 Discuss modular effects on enzyme kinetics based on competitive, non-competitive, mixed inhibition 15

Q.3 a. Differentiate between eukaryotic cells & Prokaryotic cells 08
b. With neat sketch explain in detail of secondary protein structures 07

Q.4 From fundamentals derive the Michaelis – Menten Kinetic equation 15

Q.5 Write notes on 15
a) Amino acids as building block for proteins
b) Lineweaver burk plot
c) Electrophoresis

SECTION B

Q.6 Define the following 10
(a) Substrate (b) Active diffusion (c) Isoelectric point (d) Catabolism (e) Yield constant

Q.7 A feed batch reactor, a CSTR with recycle & a PFR are available for a biochemical process. Evaluate the performance of each type of the reactor and justify the same 15

Q.8 Explain with a neat sketch growth cycle phases for batch cultivation Explain how these phase would affect the design of reactor 15

Q.9 Explain the following 08
(a) Medium formulation 07
(b) Product recovery trends

Q.10 Write notes on 15
(a) Penicillin (b) Catalyzed reactions (c) Monod growth kinetics

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Total No. of Printed Pages:2

SUBJECT CODE NO:- P-181
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E.(Chem) Examination May/June 2017
Elective-I: Industrial Piping
(Revised)

[Time: Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B
1. Solve any three questions from each section
2. Question 1 & 6 are compulsory
3. Solve any two questions from remaining question in each section
4. Assume suitable data whenever necessary

Section A

Q.1 Solve any five 2*5=10
1. BWG
2. Schedule numbers
3. Types of pipe joints
4. Reducer
5. Coupling
6. Codes for process piping

Q.2 1) How piping layout help in plant maintenance & safety 08
2) What are different types of pipe support? Design any one 07

Q.3 1) Write down different types of vibrations in piping process industries 08
2) What is value expansion effects and methods for reducing them 07

Q.4 1) What are properties of piping materials required for low temperature services 08
2) Derive the eq^{n} for equivalent pipe i.e 07

$$\frac{L}{Ds} = \frac{L_1}{D_1 s} + \frac{L_2}{D_2 s} + \frac{L_3}{D_3 s}$$

Q.5 Write short note 3*5=15
1) Criteria for piping diagrams.
2) Newtonian fluids.
3) Single liquid lines.

Section B

Q.6 Solve any five 2*5=10
1) Isothermal flow.
2) Dispersed flow.
3) Utility piping.
4) Reboiler piping .
5) Critical thickness.
6) Purpose of insulation

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Q.7 1) Design of pipe line for transportation of crude oil & for natural gas 15

Q.8 Explain following

1) pipe line storage capacity 05

2) Three pipes of diam. 300mm,200mm and 400mm and lengths 450m, 255m and 315m resp. are connected in series the difference in water surface levels in two tanks is 18m. Determine rate of flow of water if co-efficient of friction are 0.0075,0.0078and 0.0072 resp. considering 10

i) minor losses and

ii) Neglecting minor losses

Q.9 1) Write down design steps of pipes in sea water 10

2) What are factors considered in heat exchanger piping 05

Q.10 Write short note 5*3=15

1) Piping for cryogenic materials.
2) Homogenous slurries.
3) Glass wool.

Total No. of Printed Pages:1

SUBJECT CODE NO:- P-182
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E.(Chem) Examination May/June 2017
Elective-I: Energy Engineering
(Revised)

[Time: Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B i) Q.No.1 and Q.No.6 are compulsory.
ii) Answer any two questions from remaining of each section
iii) Assume suitable data, if required and draw neat sketches whenever needed.

Section A

Q.1 Explain following terms
i) Conventional & non-conventional energy sources 05
ii) Socio-economic importance of biogas production 05

Q.2 Give statistical information of availability and utilization of following energy resources considering Indian scenario. 15
a. Nuclear fuel b. Coal and petroleum

Q.3 What are effects of temperature, gas composition and product purification on biogas production. Give details of production mechanism and storage facility for it. 15

Q.4 Describe in detail the thermodynamic and heat transfer aspect of solar energy collection. Add note on storage of solar energy 15

Q.5 Write note on 3*5=15
i. Thermodynamic energy efficiency indices
ii. Tidal and wave energy and its scope.
iii. Solar stills.

Section B

Q.6 Explain following terms
i. Concept of co-generation of energy 05
ii. Energy performance assessment of heat exchanges 05

Q.7 Give detail classification of energy recovery system used in chemical process industries. Explain in details cogeneration of energy in paper industry. 15

Q.8 Discuss in detail energy conservation in sugar industry. 15

Q.9 Describe in details the importance of following concepts in energy auditing 15
a. Matching energy use to requirements
b. Target setting
c. Reduction in losses
d. Improvement in operation

Q.10 Write note on 3*5=15
a. Heat pipes as energy recovery systems
b. Heat exchanger network synthesis
c. Concept of CECP

Total No. of Printed Pages:2

SUBJECT CODE NO:- P-226
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E. (Chem.) Examination May/June 2017
Process Modeling and Simulation
(Revised)

[Time: Three Hours] **[Max.Marks:80]**

N.B "Please Check you have got correct question paper"

1. Q. No. 1 and 6 are compulsory
2. Solve any two questions from remaining of each section.
3. Figures to right indicate full marks.
4. Figure mentioned in statement of problem are given at last pages of question paper
5. Assume suitable data, wherever required.

Section A

Q.1
a. Compare design and simulation 03
b. Explain steady state model with suitable example. 03
c. Write continuity equation in spherical co-ordinate system. 04

Q.2
a. List components of cost estimation routine. 06
b. Model gas leakage through a fine capillary in wall of pressurized gas cylinder (rigid) to surrounding at atmospheric pressure, to relate changes in mass contained in cylinder, pressure inside cylinder & gas leak rate, with time. Draw the neat sketch of the system. 09

Q.3
a. List any three thermodynamic properties and write equations used to calculate these for ideal fluid. 06
b. Stationary water pool is exposed to a water soluble pollutant gas, at constant gas phase concentration C_{gi}. $At\ time\ t = 0$ the concentration in the water pool is zero. The gas diffuses in to the water. Model the mass transfer from a gas-to-water to estimate gas concentration at distance X from the surface of water, as a function of time. 09

Q.4
a. Develop mathematical model for batch distillation of binary mixture. 09
b. The heat capacity of carbon dioxide is given by 06

$$C_p = 1.716 - 4.257 \times 10^{-6}\, T - \frac{15.04}{\sqrt{T}} \quad (1)$$

Where C_p is in KJ/kg K and T is in K, Determine the temperature at which heat capacity of carbon dioxide is 1 KJ/kg K. Use Newton's method.

Q.5 Unsteady state heating process results in following set of differential equation. 15
Solve equations simultaneously by Euler's method and Runge-Kutta method, Make four step prediction for temperature and mass with time step of t = 0.1

$$\frac{dM}{dt} = 60 \quad (2)$$

$$\frac{d(MT)}{dt} = 46170 - 427.8T \quad (3)$$

With initial conditions of $t = 0, M = 500kg, T = 40$ °C $where\ M$ is mass of fluid at the water in kg, T is temperature of water at out going stream.

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Section **B**

Q.6
a. For a centrifugal compressor, list parameters and variables required for modeling and simulation. 03
b. Write and explain equations required to model continuous binary tray distillation column. 03
c. Write a short note on DWSIM. 04

Q.7
a. Draw a neat labeled sketch of single effect evaporator. The dilute feed enters the evaporator to produce concentrated liquor at steady state. Fraction of concentrated liquor leaves the evaporator with vapour stream. Steam is used to for heating. Develop total and component continuity equation. 06
b. A cylindrical pipe is used to heat the gas. The pipe wall is heated using electrical strip heater. Pipe wall can be assumed to be isothermal at T_ω temperature. Draw a neat labeled sketch and develop mathematical model for the system. Which will enable estimation of gas temperature along axis of pipe. 09

Q.8 Batch heater is shown in figure1. The liquid in the tank is heated using a hot fluid on jacket side. Write energy balances on jacket side and for tank fluid. Write an algorithm to simulate temperature changes for tank fluid. State assumptions made. 15

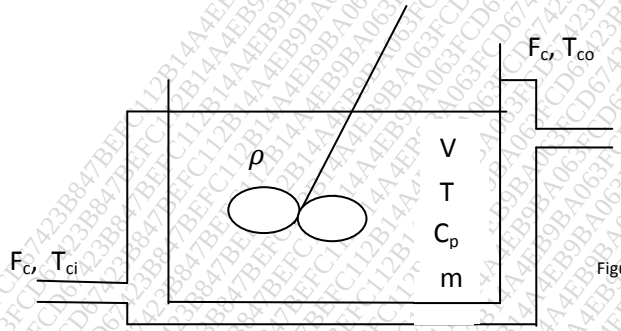

Figure 1:Batch heater

Q.9
a. Draw a neat labeled sketch for packed column used to absorb a single component from gas phase. Write down notation used. Model the absorption column by developing total and component continuity equation for gas and liquid phase. 09
b. Derive a model for an ideal CSTR followed by ideal plug flow reactor for carrying out bi-molecular reaction under isothermal conditions. 06

Q.10
a. Draw neat labeled sketch of 1-1 S & THE and write an algorithm for simulation of 1-1 S & THE for predication of steady state outlet temperature of hot fluid with change in hot fluid flow rate. 05
b. Describe the functioning of trickle bed reactor with neat labeled sketch. Discuss fundamentals equations and laws required for modeling of trickle bed reactor. 10

Total No. of Printed Pages:1

SUBJECT CODE NO:- P-257
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E. (Chem) Examination May/June 2017
Advanced Separation Processes
(Revised)

[Time:ThreeHours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B i) Q.No.1 and Q.No.6 are compulsory.
ii) Answer any two questions from remaining of each section .
iii) Assume suitable data, if required and draw neat sketches whenever needed.

Section A

Q.1	Explain following terms	
	i. Pressure swing adsorption	05
	ii. Concentration polarization	05
Q.2	Explain in details liquid chromatography process in detail. Also explain how the characterization is done for this. Add its industrial a applications.	15
Q.3	Give different type of membrane configuration commercially used in industry membrane separation processes.	15
Q.4	a. Calculate the osmotic pressure of a solution containing 0.1 gm mole of NaCl per 1000gm of water at 25°c. Assume suitable data if required.	07
	b. Derive solute flex equation for separation by osmosis occurs.	08
Q.5	Write note on i. Reactive extraction ii. Micro-filtration unit iii. Ion exchange	3*5=15

Section B

Q.6	Explain following terms	
	i. Adductive crystallization	05
	ii. Properties of foam related with floatation operation.	05
Q.7	Give detail designing and development of floatation equipment used for separation.	15
Q.8	Discuss in detail principle, mechanism and equipment for zone electrophoresis.	15
Q.9	How separation by ultra-Centrifugation is carried out? Explain in detail its principle and mode of operation.	15
Q.10	Write note on i. Bubble and from separation ii. Application of zone electrophoresis. iii. Electric and magnetic field separation	3*5=15

Total No. of Printed Pages:1

SUBJECT CODE NO:- P-258
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E. (Chem) Examination May/June 2017
Industrial Pollution and Control
[OLD]

[Time:ThreeHours] **[Max.Marks:100]**

Please check whether you have got the right question paper.

N.B i. solve any three questions from each sections.
ii. Give necessary diagram equation & flow diagram whenever necessary.
iii. Assume suitable data, if necessary.

Section A

Q.1	Explain in detail following Environmental legislation,	8*2=16
	a. Air Act 1981	
	b. Environmental Act 1984	
Q.2	How will you estimate plume rise? Explain Gaussian plume model.	16
Q.3	Define collection efficiency for particulate matter. Derive the expression for I, In cyclone separator	18
Q.4	What is role of hydrological &nutrient cycle of environment?	16
Q.5	Write notes on :	16
	a. Stack sampling	05
	b. Inertial separator	06
	c. Ozone depletion	05

Section B

Q.6	Explain the procedure for following characterisation of waste water	8*2=16
	i. BOD	
	ii. Hardness	
Q.7	Explain with neat sketch & working in detail of trickling filters	16
Q.8	Discuss in detail sources of pollution & its control measure for paper& pulps industry.	16
Q.9	Explain how the solid waste management is done in cement manufacturing unit.	16
Q.10	Write note on	18
	i. Rotating biological contactor	
	ii. MLSS & MLVSS	
	iii. Dissolved oxygen depletion	

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Total No. of Printed Pages:1

SUBJECT CODE NO:- P-290
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E. (Chem.) Examination May/June 2017
Petrochemical Engineering
(Revised)

[Time: Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B
i. Solve questions 1 & questions 6, both are compulsory.
ii. Solve any two from remaining in each section.
iii. Draw neat flow sheet wherever required.

Section A

Q.1 Define 10
a) Dewaxing
b) Viscosity index
c) Isomerization
d) Alkylation
e) Reforming.

Q.2 a) Explain anyone organic theory about the origin of petroleum. 07
b) Give brief view of petrochemical industries in India. Also describe types of crude. 08

Q.3 With a neat flow sheet explain the production of butadiene from Butane. 15

Q.4 Explain in detail derivatives of higher paraffin's. 15

Q.5 Write notes on 15
a) Ethylene
b) Naphtha cracking
c) Economic aspects of petrochemical industry in India.

Section B

Q.6 A. Define the following 06
a) Octane numbers
b) Visbreaking
c) Pyrolysis
B. Differentiate between emulsions and suspension. 04

Q.7 A. Why are the prices of petroleum products changing now and then? Explain. 10
B. Describe the manufacturing process of any one type of special polymers. 05

Q.8 Describe the safety considerations required in a petrochemical industry. 15

Q.9 What do you mean by polymer? Explain different types of polymerization techniques. 15

Q.10 Write notes on 15
a) BHC
b) Energy crisis
c) Maleic anhydride.

2017

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SUBJECT CODE NO:- P-349
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E.(Chem) Examination May/June 2017
Food Technology [Elective-II]
(Revised)

[Time: Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B i) Q. No.1 & Q. No. 6 are compulsory from section A and section B.
ii) Attempt any two questions from remaining in each section.
iii) Assume suitable data, if necessary.

Section A

Q.1 Define the following terms. 10
1. Food
2. Shelf life
3. Irradiation
4. Osmotic dehydration
5. Preservatives

Q.2 a) Explain the present status & future prospectus of bakery industry in India. 08
b) Define food spoilage & explain in short controlled atmospheric storage of food. 07

Q.3 a) Explain in detail different unit-operations carried out in food industry. 15

Q.4 a) How will you preserve the food by using low temperature? 08
b) Write in short different quality parameters of food. 07

Q.5 Write short notes on:- 15
a) Microwave heating
b) Food additives
c) Fermentation.

Section B

Q.6 Define the following:- 10
a) Smoking of meat
b) Blanching
c) Sterilization
d) Nip
e) Tenderization

Q.7 What do you mean by alcoholic beverages? Explain the manufacture of beer with flow sheet. 15

Q.8 Explain various food preservation methods (Any three methods). 15

Q.9 What are various packaging methods? Explain Aseptic packaging. 15

Q.10 Write notes on:- 15
a) Ageing of meat
b) Chocolate from coco powder
c) Cold storage

2017

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N.B i) Q. No.1 & Q. No. 6 are compulsory from section A and section B.
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2017

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SUBJECT CODE NO:- P-350
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E.(Chem) Examination May/June 2017
Polymer Technology [Elective-II]
(Revised)

[Time: Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B 1) Question No 1 and 6 are compulsory
2) Solve any two from remaining in section A & B each.
3) Draw neat sketches & use data wherever required

Section A

Q.1 Solve any five 10

1) Cross linked polymer

2) Poly diversity Index

3. Free radical

4. Copolymerization

5. Polymer solubility

6. Thermo sets

Q.2 a) Describe in detail structures of polymer 08

b) Explain chemical bonding in polymers 07

Q.3 a) What is mechanism of polymerization 08

b) Explain suspension polymerization 07

Q.4 a) What are different properties of polymer & also determine method of determination 10

b) Explain crystallinity in polymers 05

Q.5 Write short note 15
a) polymer degradation
b) Functionality of polymer
c) Emulsion polymerization

Section B

Q.6 Define following terms (any five) 10
a) Polymer reaction
b) Step growth
c) compounding
d) slush molding
e) ABC polymers
f) PVC

Q.7 a) Describe kinetics of free radical polymerization 08

b) Explain Extrusion molding technique of polymer processing 07

2017

Q.8	a) Explain spinning processing with example	08
	b) Explain chain transfer agents	07
Q.9	With neat sketch write down production process of a) polypropylene	08
	b) polyether	07
Q.10	Write short note a) fluorocarbon polymers b) Aldehydes c) casting	15

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