

Panel : Jayanata Chakraborty, G Kundu, AK Jaana

1. Jayanta

- What are the pillars of Chemical Engineering ?
- Sir....Reaction Engg, Fluid Dynamics, Thermodynamics, may be Transport Processes.

- Pick your favourite
Thermodynamics

- What is thermodynamics ?

- Okay, is this equation an ODE or a PDE ?
This is an IVP or a BVP ?

How do you solve it ? What are the different ways of solving ODE, PDE?

Tell me 4 different mechanical operations ?

Write down the Hagen Poiseuille Equation. Write Raoult's law, for ideal and non ideal solutions.

2. AK Jaana

Write down Raoult's law, for non ideal solution.

How do you measure vapour pressure (Answer : Antoine Equation)

Claussius Clapeyron Equation

Dalton's law

Bubble point calculations

How could you calculate latent heat of fusion, if ΔH_L , ΔH_V are given?

What is fugacity ?

Gautam Kundu

1. Favourite subject : Industrial Pollution control, Boundary layer, Mechanical operations before midsems

2. What is boundary layer. When it is formed.

3. Relation between delta and x.

4. Laws of crushing

5. mesh number.

6. Crusher efficiency and mechanical efficiency.

7. Conductive heat transfer.

8. Why do we consider boundary layer ?

9. draw a closed loop grinding

10. What is View factor - Radiation.

Sudipto Chakraborty:

IPC/heat transfer:

what is order of a system;
eqn of 1st order system
significance of tau in that eqn
explain nusselt's number and heat transfer coefficient
difference between biot no. and nusselt number

Somnath Ganguly:

Mass Tr/Fluid mech

name a few flowmeters
how does rotameter work
where does drag force in rotameter work
how does pitot tube work
where can you take the free stream pressure for pitot tube (he said you can also take it near the tube)
Difference between Reciprocating and Centrifugal pump(he wanted to be specific)
Why we use extraction (compared to say distillation for some processes)

NC Pradhan:

Rxn Engg

What is dissolution constant for the exp which we did in the lab for benzoic acid (rxn engg lab)
Then he said to derive the eqn from mass balance
Design eqn for a solid bed catalyst
From mass of catalyst how to find volume (divide mass by which density?)

Panel: NC Pradhan, Sudipto Chakraborty and Somnath Ganguly

NCP:

- 1.) Where is the non linear term in rate equation?
- 2) What are the types of ideal reactors?
- 3) Why are they called ideal? What are non-ideal reactors?
- 4) Questions on Dissolution of benzoic acid.
- 5) What is integral method of analysis?
- 6) What method of analysis did you use in your lab/
- 7) What do you have to assume?

Sudipto:

- 1) What is first order system?
- 2) Significance of time constant? Physical significance?
- 3) What is offset?
- 4) Do you eliminate all the errors in P only controller? Why? Mathematical expression.
- 5) Nusselt number and Biot number difference?
- 6) Fundamental differences of Conduction, Radiation and Convection?
- 7) Significance of 'h'

Somnath:

- 1) What is Newtonian and non-Newtonian fluid? :)
- 2) Flow measuring devices: name some conventional ones
- 3) Derive how flow is measured by a flowmeter and orifice plate :(
- 4) When do we use Centrifugal and Reciprocating pump? Why?
- 5) Name some separation processes

6) When do we use Extraction over distillation?

DD Kar

- HR qs, asked about iim interviews :P
- asked formula for $1/U$ not for heat exchanger
- why are baffles used, what are tie rods
- hydraulic dia of a square pipe
- reynolds analogy : what number equals $f/2$

SRAY

- gross n net calorific value
- difference between vapour and gas
- calorific value of coal
- draw a nozzle with ring pad and shell
- centrifugal pumps - graph of H versus Q , shutoff head, operating zone, NPSH
- what are the impurities from refinery
- how to design 1-2 heat exchanger
- how to remove CO_2 , SO_2 and NO_2 from gas
- what is critical temperature and pressure
- a few other qs i could understand nothing of and so cant remember at all :P

SDG

- choose between momentum, heat and mass transfer..i chose momentum
- showed me truncated navier stokes eqn, asked me to identify what it was and explain physical significance of each term
- showed the above equations momentum integral soln and asked to identify boundary conditions after guessing the non-dimensional forms needed
- asked what is view factor in radiation..i said never heard of it..so he gave me the definition and asked me to calculate view factors of flat, curved and spherical surfaces
- asked me the reynolds analogy qs asked by dd kar
- asked me the terms in bernoullis equation and "which subject would be needed to incorporate viscous terms in this eqn"
- - Sonali Sengupta
 -
 - What is solvent?
 - How paint dries?
 - Single/dual site mechanism
 - Compounds used in Nylon 66
 - Name of benzene structure
 - Which will you arrange a large reactor and small reactor in a series combination?
 - Given equilibrium constant, how will you find equilibrium conversion?
 - Ammonia formation- exo or endo?
 -

- Meikap
-
- Where rotameter cannot be used?
- Force balance for the same
- Schematic diagram of 2-4 heat exchanger
- Write formula for overall heat transfer coefficient in tubes
- Significance of Nusselt no
- Lubricants used in fans?
- What type of fluid are they?
- Draw shear stress curve for it
- Diff types of fluid?
- How flow is measured for waste water flowing in drains in industry?
-
- Sudarshan Neogi
-
- Thermoplastic and Thermosetting polymer - diff
- Petrol and Diesel difference?
- Instruments used to measure flow?
- Give example of variable head and area flowmeter?
- Non invasive techniques of measuring flow?
- Pitot tube
- What type of material is bottle - thermoplastic
- Boundary layer in pipe with distance for laminar and turbulent flow
- WHAT is boundary layer?
- On what factor does boundary layer height depends? - velocity, length
- What is difference between biochemical and chemical reactions?
- Name one biochemical reaction?
- Antibiotic production
- Stefan Boltzman law
- What kind of heat transfer can take place from a table top?
-
- Harikrishna
-
- What is viscoelastic fluid?
- Give example
- What kind of forces come into play in micro-channel?
- Why microchannel?
- Separation in microchannel
- BTP details
-
- Sonali
-
- What is Standard temp and pressure? Normal temperature and pressure?
- H₂SO₄ production? What is meant by 20% oleum?
- Aie liquefaction?
- What kind of column used?
- What comes out at the bottom and the top?
-
- Sudarshan
-
- Pump characteristics
- Name a type of packing used in column?
- How do you make it?
- Meikap
-
- How to design diameter of feed nozzle in distillation column?
- What is channeling? How do you prevent it?

- Kundu Says :-
-
- Pick Your favorite subject
- A) Fluids ,errr..... bit of Heat transfer .
-
- K says:- Lets start with heat transfer then ... grrr
-
- 1)Dittus-Boelter Equation
- 2)Sieder -Tate Equation
- 3)Significance of Re , Pr and Nu.
- 4)Define Emissivity
- 5)Planck's & Stefan's Law
- 6)View Factor & its Significance
- 7)Forces acting on a body immersed in fluid.
- 6)Drag force and its importance.
- 7)Corelation between fanning factor and Drag coefficient
- 8)Do u know anything about Mechanical Operations... "err sir I am nt sure."
- 9)Ok ,whats filtration ?
- 10)Bond's Law & Work Index
- 11)Genralized Filtration Equation.
-
- Jana says :- Pick Your fav subjects
- "sir , Fluids"
- J says :- Why?
- "i Think I can do better in Fluids"
- J says:- very diplomatic ...
- 1) Whoz the foreign secretary?
- 2)Whoz the External affairs minister?
- 3) Whoz RBI Governor ?
- 4)Flowmeters classification ?
- 5) write down the popular ones..
- 6)Difference between Venturi and orifice meters?
- 7)WHich is better?
- 8) How does Drag coefficient effect them ?
- 9)Flow ranges of both ?
-
- JC :- Pick your fav subjects ,
- "fluids"
- JC:- I have been asking fluids till now,lets switch to Mech Op...
- 1)FOur mech ops
- 2)Instruments for eeach of the 4
- 3)Dynamical Matrix
- 4)Inverse of a Matrix
- 5) e^{-x} graph
- 6)PDE or ODE ?
- 7)linear or non linear ?
- 8)RK Method of sloving ODE,equation,
- 9)For a laminar flow in a pipe given Pressure difference ,find Avg Velocity
- 10)Will it change if the flow is turbulent
- 11)Filtration involves what fluid dynamics principle
- 12)Whats the basic equation in VLE? whats k in it ?

My Panel was DD Kar, S Ray and SDG.

S Ray-

- Choose fav subject among Fuel, combustion, Process Control, Mass Transfer, Design.

- What is Feed Forward control. And does it have to always contain Feedback control inside it.
- What is a 'bias' value in the PID equation.
- Give the order of Calorific Value of Coal.
- Draw an Engg Diagram of a nozzle connected to the heat exchanger wall.
- What is SORP.
- Temperature gradient inside a Distillation column.
- Pressure gradient inside a distillation column.
- What is NPSH?
- What is the direction of impeller blades in a centrifugal pump, direction of flow.
- What are the characteristic curves for a pump.

DD Kar-

- HR questions about placement, Apping, CG, internships etc.
- What is a tie rod? Where is it connected to in the HE?
- What is Reynold's analogy? and Which dimensionless number contributed to a crucial equation here. ($St=f/2$).

SDG-

- Choose between Momentum, heat and Mass transfer.
- Why do you people always chose Momentum? :P
- NS equation, boundary layer, bernoullis eq with assumptions and conditions and the different losses associated with real fluids (major and minor).
- Which field deals with these losses?
- Laws of Thermodynamics.
- About viscosity, shear stress, what is denoted by $\tau(xy)$ etc..
- About Radiation.. About Black body, gray body ..
- In a tank, if a hole is drilled, near the hole which losses are to be expected?
- Momentum Integral form for a Boundary layer. Given the equation, mention the boundary conditions.
- My panel was Meikap , SSG , GH and Sudarshan Neogi
-
- Meikap :
-
- What is priming of a pump ? How will you accomplish it ?
- What is NPSH ?
- What is cavitation ?
- How would you come to know if there is cavitation in a pump ?
- What type of pressure devise is used to measure pressure just after a centrifugal pump . Why ?
- LMTD in countercurrent is less than LMTD in co-current in a special situation . What is that ?
- Draw the flooding vs liquid velocity curve for a packed tower ?
-
-
- GH -
-
- What is octane number ?
- What is cetane number ?
- What is knocking and how would you describe knocking as a chemical engineer ?
- Why do higher branched hydrocarbons have higher octane number ?
- What is unleaded petrol ?
- Why is the chemical used in unleaded petrol used ? And what is its mechanism of improving the quality of petrol ?
- In terms of ΔG , thermodynamically explain how boiling takes place ?
-
- Sudarshan Neogi :

-
- What is the fundamental difference between petrol and diesel ? In terms of composition ?
- In steam pipelines , how will you ensure there is no condensation ?
- When there is condensation , how will you remove it ?
- What are steam traps ?
- What is cloud point ?
- What is pour point ?
- How will you pump highly viscous liquids ?
- What is PPD ? (Pour point depressant)
- What are different types of packing in the packed column ?
- Suppose you are a construction engineer , how will you fill up the column with the packing ?

JKB

1. PV plot
2. derive eqns for PFR CSTR
3. Ideal NonIdeal reactor
4. 2 reactors in series, how to arrange?
5. some greek roman stuff 4m thermoD

SDe

1. asked to plot velocity and temp profile for various different conditions
2. why we measure flowrate
3. why we measure temp profile
4. some simple Qs

DS

1. non interacting CSTR
2. block diagram for feedback ctrler
3. Swati Neogi
- 4.
5. Bernoulli's equation and two flow meter where it is applicable.
6. Distillation column, equation used and significance of q (the term that comes in operating line equation)
7. Principle of Rotameter.
8. Mass Transfer Theories.
9. Derive overall mass transfer coeff in two film
10. NPSH
11. Surface Renewable Theory
12. Raoult's law and what would you use in case of Non-ideal solution
- 13.
- 14.
15. D Mukh
- 16.
17. Crushers, Mills, critical velocity(to derive the expression)
18. Kick's law Bonds law and rittinger's law..and what is the basic difference
19. Settling: free and hindered
20. Different types of settlers
21. What is thermistor,
22. temperature dependent resistor
23. how does a thermocouple work
24. thermometers which use conductors's resistance
25. Transfer function, stability of a process, poles and zeroes
26. Urea manufacturing

27. Ammonia manufacturing..starting from how we obtain H₂ and N₂
28. producer gas, water gas, the difference between them
- 29.
- 30.
31. Saiket
32. Derive NS equation of heat conduction in a cylinder
33. Derive the unsteady state conduction equation of a sphere with initial temp T₁ fully submerged in fluid of temp T₂. Boundary conditions.
34. Heat conduction equation in three slabs of diff k and length
- 35.
36. Derive equation in a CSTR, unsteady state and A→B+C
37. Competitive reaction in a CSTR if initial mole flow rates are fixed and k₁/k₂ is given how would you control product formation
38. Eigen values for matrix
- 39.
40. how to solve 1st order ODE of a matrix
41. DDkar
- 42.
43. 1. Overall heat transfer coefficient
44. 2. Dirt Factor
45. 3. My future Life, Job, Job interview, blah blah (this constituted arnd 80% of conversation :P)
- 46.
47. SDG
- 48.
49. started with choice of fav sub among Momentum/Heat/Mass transfer, I chose momentum and carried from there
- 50.
51. 1. Newtons law of viscosity, lot of paraphernalia around that
52. 2. Navier Stokes analysis
53. 3. Boundary conditions, derivations
54. 4. Boundary layer comparisons in mass/momentum/heat
55. 5. Bernoulli: assumptions, variations, correction for viscosity blah blah
56. 6. Thermodynamics
57. 7. Heat Transfer correlations for momentum and mass (Dimensionless numbers, their comparison. importance..)

Panel: Kundu, Jana, Jayanta

Kundu:

- Fav subjects? (FF, HT)
- Draw a three effect evaporator. Co current, Counter current
- Draw a shell-tube 1-2 HEx
- Derive the LMTD for that (Ans: one of the tube passes will be cocurrent, other pass countercurrent)
- Draw the temperature profile for the shell side and tube side fluids along the length of the HEx
- Write the Stokes Equation
- What is Particle Reynolds Number?
- Basic equation of filtration?

Jana:

- What do you know about Pool Boiling?
- What are single effect evaporators, multiple effect evaporators, and their advantages and disadvantages?
- Do we use saturated steam or super heated steam in evaporators?

- Draw a HEx
- Do we have 1-3, 1-5 HExes in the market (odd no. of tube-side passes)? Why not?
- If the shell side fluid is a gas, and tube side is a liquid, where will u fill the liquid from, top or bottom?
- Why do we not have too many baffles? Won't it increase turbulence and heat transfer? (Ans: pressure drop will inc, cleaning will be difficult)
- Do you have any idea about the pitch? Advantages and disadvantages of square pitch and triangular pitch? (Ans: triangular - more compact, square - less pressure drop, easier to clean)
- Draw a distillation column
- Where is the temperature higher?
- Can we design a system to exchange heat from the top portion to heat the reboiler? Is it more economical to heat the reboiler separately or to heat the already warm gases and then make them lose heat by exchanging with the reboiler so that the warm gases are also condensed and the reboiler is also heated? Will the control of such a process still be easy? (This was kinda like an arbit discussion with him)

Jayanta:

- Name 5 mechanical operations
- Plot the graph of $e^{(-1/x)}$ (via with pen and paper only)
- Various methods of solving PDEs?
- Difference between crushing and grinding?
- Use of analogies in FF, HT, MT?
- Kundu: I wil ask mech op/heat/fluid
- A. MECH OP
 - 1. Darcy equation?
 - 2. equal velocity for Stoke n newton regime
 - 3. Kozney karmen equation
 - 4. Filtration equation and derive for constant flow rate and constant pressure difference
 - 5. Specific cake resistance significance
 - 6. how it varies with compressible/incompressible flow
 - 7. Settling types
 - 8. Power number
 - 9. Work index
 - 10. particle reynold number
- B.FLUID
 - 1. flow rate of flowing river without measuring velocity Ans: dam will act as V notch
 - 2. how will u tell whether flow is turbulent without calculating reynold's number Ans: Draw velocity profile with pitot tube and flat at centre will indicate turbulent flow
- rest dunn remem
- C. heat
 - 1. view number for radiation
 - 2. convection related questions
- Jana
 - 1. heat ransfer design questionstube shell exchangers
 - 2. compressor design and flow parameters calculation
 - 3. condensor
 - 4. decantaor design
 - 5. 3 mass transfer operation: adsorption. distillation.. and decantor complete primary and auxillary control loops

- Jayanta
- 1. talk on turbulence
- 2. talk on all subjects till now n dere importance
- 3. gave some math functions n draw dere curve
- 4. various king of ode/pde and dere solution
- 5. u like chemical or finance.....If u dont like both give some talk on topic you like

JKB

- 1.) Kinetic model.. collision theory etc..
- 2.) write three formulas for k as func of Temp. ans one is Arrhenius
- 3.) What is CSTR and PFR main diff : 1.) Back mixing 2.) dispersion
- 4.) Write NH_3 dissociation rxn. Write eq. constant
- 5.) two CSTR 1 liter and 10 liter which one first
- 6.) CSTR 5 liter PFR 5 liter which one first

Jayant K Basu

- 1) Define solvent. [after my explanation he told me solvent must not be reactive with solute]
- 2) Types of solvent, examples of organic solvent
- 3) collision theory explanation
- 4) Questions based on Arrhenius equation
- 5) Define space time, RTD and explain difference between two
- 6) Talked about Dispersion no.
- 7) Utility of Dispersion no

S dey

- 1) difference streamline, streakline and pathline
- 2) Irrotational flow and example . Mathematical condition
- 3) Darcy law , Explain Retention on membranes
- 4) which dimensionless no is important for Natural convection
- 5) Define Grashoff No with mathematical expression
- 6) Condition for buoyancy between two parallel plates

DS

- 1) Turbo problem and servo problem
- 2) Effect on $G(s)$ when set point is changed when K_p is used .
- 3) Block diagram for a process control system
- 4) Output responses in 2nd order non interacting sy

design a packed bed reactor. (assume whatever u want)?

calculate the height of a distillation column?

Panel : SDG , S ray , DDK

S Ray :

1. What is the difference between gas and vapour?
2. What is LMTD correction factor?
3. Which temperature measuring instrument will you use to measure temperature in a furnace?
4. What is channeling in packed bed tower?
5. Give conditions of flooding?

SDG:

1. Describe Reynold's Analogy
2. What assumptions are used for deriving Bernoulli equation?

D Sarkar:

1. Derive the most general form of heat balance equation.
2. Solve it for 1D case for the specified boundary conditions.
3. What other analytical methods do u know for solving PDE?
4. Computational methods.
5. Are u aware of Matlab's toolboxes?
6. ODE45 solver mein do u know what's the significance of 45?
7. Algo associated with ODE45 solver?
8. Draw y^* vs x and enthalpy vs x
9. Temp vs x, y
10. Name different devices to measure pressure.
11. What device wd u use to measure pressure of a vessel containing corrosive liquid.
12. Diagram of bourdon tube.
13. Is the bourdon tube circular or does it have some special cross section?

JKB

1. given V_o vs C_a kaa data how wd u find kinetics const k ?
2. $A + B \rightarrow C$ mein u r given conversion x how wd u find eq const.
3. for gas reactions how wd u find ϵ ?
4. What is enthalpy? write equation.
5. Internal energy

S De

1. Top plate is heated bottom plate is cold. There's air in between. Will the heat flow?
2. What's the diff bn Nu and Bi ?
3. What's the significance of Bi ?

My GV panel was D D Kar, SDG, S Ray.

Questions were more or less the same as KKJ and arvind.

S. Ray: what is the critical temp. of steam?

how do we create vacuum in a vacuum evaporator?

How is sulphuric acid made from? where does Haldia Plant get sulphur from?

pollutants in fuel gas containing sulphur burnt in air?

D. D. Kar: what's the equation of a fluidized bed?

rest was all HR

SDG: components of Navier Stokes eqn?

momentum transfer in fluid flow?

Bernoulli's theorem as the same as arvind.

liquid liquid boundary layer?

My Panel was Profs. Somnath Ganguly, NCP and Sudipto

SNG

- 1) What are ur immediate plans after KGP?
 - 2) Where do u want to see urself 5 years down the line? (This took arnd 5 mins :P)
- Now Viva.
- 3) Units of Viscosity, mass transfer co-efficient?
 - 4) Working of Rotameter, Pitot Tube, Orifice Meter.
 - 5) An Instance where u ll prefer centrifugal pump over positive displacement pumps?
 - 6) When ll u prefer distillation column over extraction column?
 - 7) Newtonian and Non-newtonian fluids- definition, equations and examples.

NCP

- 1) Diff. between ideal and non-ideal reactor?
- 2) Design equations of Batch, PFR, CSTR.
- 3) Space time and Space velocity?
- 4) How PFR equation is different from batch?
- 5) How do u determine order of a reaction?
- 6) What are the parameters of non-linearity in a rate equation?

Sudipto

Look above. He was asking the same set of question

SSG:

What is Arrhenius Equation?

Which factor determines probability of collision of reactant molecules to form the product?

Temp dependence of rate constant.

Draw energy of system vs reaction progress.

Decomposition of Ammonia - exothermic or endothermic?

Favored at high pressure, high temp or low pressure, low temp?

Two batch reactors, diff volumes, how will u decide on series arrangement?

$A+B=R$, $B+R=S$. series or parallel? draw concentration profiles of all species.

Sudarshan Neogi:

Drew 5 cars on paper-3 continuous, one gap, then 2. If i add one more car in the gap will entropy of sys inc or dec?

Bottle of Bisleri- thermoplastic or thermosetting?

Give an example of thermosetting.

Critical insulation thickness?

Prandtl number?

Corresponding number from mass transfer?

Steam flow in insulated pipe, some condensation is bound to occur. what device is used in industries to take care of it?

How are the packings installed in a packed tower? Are they thrown down from the top? :D

Flow measuring devices? variable head? variable area? non invasive flow measuring devices?

Composition of cement?

Example of Bingham plastic.

State second and third laws of thermodynamics.

BC Meikap:

What kind of pump will u use for water? Centrifugal or reciprocating?

The max depth from which centrifugal pump can draw water? (Gave time to do calculations)

Sherwood number? Its physical significance?

Characteristics of pumps.

Degree API Gravity?

One/two more, i can't remember.

G Hari :

Pick a subject - Thermodynamics.

Are u comfortable with statistical thermodynamics?!! (Sir, let's stick with classical)

Diff b/w Gibbs' and Helmholtz Free energies.

Relation between rate constant and Gibbs energy.

Ideal/non-ideal solutions.

Activity of solution?

Can we measure absolute free energy?

Phase change... governed by H or G?

almost same as that of anshul's .

Difference questions were:

neogi asked abt process control(i chose PC as my strong one)

Name few controllers?

What's the use difference b/w feedforward and feedback controllers & their corresponding advantages?

abt bode plot & nyquist plot?

What is used to remove condensed steam from steam pipes in refineries ?(ans : steam trap)

Harikrishna asked to describe the work of my BTP

SSG : ditto as that of anshuls

Meikap:

Diff. b/w gross calorific value and net calorific value?

What is smoke point & its value for kerosene?

How to measure open channel flow?

wht is co-carbonation?

purest quality of water used in industries?

What does 50mm Hg vacuum mean?

and some(related to fuel lab) I don't remember (haven't heard the names

BCM

- Definition of Smoke Point.
- Definition of equilibrium moisture content, critical moisture content. If a bag of saw dust is placed in the sunlight for a few days, what happens to its moisture content?
- Plug flow reactor equation, CSTR differential equation. definition of space time and velocity.
- Cracking, use of FCC and its products.
- How to measure flow of water in a river (I am not sure about the answer- there is some info on [this](#) page).

SNG

- Unit of heat, mass transfer coefficient, diffusivity.
- Difference between centrifugal and reciprocating pump. Characteristics of a pump.

S. Neogi

- Importance of creating nano scale particles- answer is that nano sized particles will provide more effective surface area, so even a very small weight of nano sized silver particles can be used to plate a large area. Also, area increase will make better catalyst particles.
- Biochemical engineering: stages in the growth of microbes,
- Cracking and its use. Composition of naphtha.
- Refinery distillation components- the carbon numbers and processing of each stream.

RM

- Natural convection- definition + a small problem about the temperature profile and velocity profile in a system with natural convection.
- What is the process when a teabag is dipped in hot water? (Leaching)
- Difference between leaching and extraction.
- What are streak lines.
- **D. Mukherjee**
- 1. Draw 1-2 Heat Exchanger. What is LMTD correction factor? Write all the design equations for HEx. How to find the Overall Heat Transfer Co-efficient- the empirical relation was asked?

- 2. Draw Feedback Control.
- 3. Concepts regarding Mesh.
- 4. What are the crushing laws?
-
- **Saikat**
- 1. Solve $dy/dt = f(y)$ using Euler's implicit and explicit method.
- 2. Difference between rate reaction and equilibrium reaction in mass transfer with examples.
- 3. Write unsteady state equation for PFR.
-
- **Deshpandey**
- 1. Difference between RK and SRK eqn of state
- 2. Concepts regarding phase diagram.
- 3. Concepts regarding Newtonian and Non-newtonian fluid

GH

1. Tell me which subject you like the most. (I told Fluids mechanics. a 5 min discussion on why all the students prefer this subject)
2. Where did you get your job. Another 5 min discussion on that.
3. Tell the name of scientist who found out the analytical solution to NS equation. Significance of each term in NS

SNG

1. What is elementary reaction.
2. Half life for 1st order.
3. McCabe Thiele method for calculation of no of plates
4. Arrhenius equation. graphs for the same

Gargi Das

1. Centrifugal pumps, NPSH, Cavitation, Characteristics curve
2. LMTD for counter current, co current
3. Fugacity. what does a pressure gauge measure

S ray

1. LMTD
2. LMTD correction factors
3. What is head in a pump
4. NPSH units

SNG

1. Unit of viscosity, diffusivity, MTC etc.
2. Orifice, venturi, vena contracta
3. Vapour pressure meaning, variation with temperature, Antoine's eqn, boiling,

S. neogi

1. Vacuum pump is which type of pump.
2. Maximum possible vacuum achieved
3. Value of orifice and venturi constants
4. What is case hardening. desirable undesirable why..most common example
5. Give an example of pseudo 1st order reaction.
6. thermocouple material, Seebeck effect, one example.

A K Jana

Choose between heat transfer, IPC, mass transfer, Cape lab, thermodynamics, refinery process.
I chose refinery.

asked everything about atmospheric tower including name, location of product, cut ranges, further treatment unit etc...he was good more than what i expected.

Swati Neogi

- 1) Mass Transfer driving force? Two film theory?
- 2) Theories of Mass Transfer? (Film, Penetration, Surface renewal and BL theory)
- 3) Diff n between Penetration and Surface renewal theory?
- 4) Bernoulli's Equation?

S De

- 1) Important dimensionless no used for free convection? Define it?
- 2) What does the terms in NS equation signifies?
- 3) Difference between Nusselt and Biot no.?
- 4) Unit of Viscosity?
- 5) Asked to solve a simultaneous equation in Sin and Cos X

D D Kar

10 minutes of HR questions and Funda giving

After that

- 1) What is the pressure drop equation for packed bed?
- 2) Factors on which it depends?
- 3) Overall heat transfer coefficient for a double pipe heat exchanger?

DS

- 1) Different pressure measuring instruments?
- 2) Name of some advanced controllers?
- 3) Heat balance equation for body of any arbid shape?
- 4) Unsteady state heat balance equation with generation term?

DS:

1. How r u, how is everyone in ur family
2. Who became the happa of Patel? are u satisfied with the hall elections :P
3. Write the heat equation. Write it for stationary object. Is this equation linear? What are linear/non linear equations? Is it parabolic/hyperbolic/elliptic n how? How will u solve this type of equations<Its non linear, K, Rho, Cp are dependent on temp, told him when n how it can be linear/non linear>
4. Names of pressure and temperature controlling elements. How do they work?
- 5, 6 can't recall :(

DDK:

1. naukri kahan lagi beta? what kind of job profile is it, salary, working hours etc etc, difference between PPOs and placement junta, tips to crack the interview, psychology of an interviewer etc etc
2. water in bucket, being heated using an immersion heater/rod. How will u find the time for which you should put the immersion heater in water? <Ans: there is some equation which contains grashoff number>
3. sphere of dia D, cube of side D both have the same hydraulic radius <made me calculate it>. Then how would the fluid flow be different in pipes having circle and square as the cross sections -- They have the same hydraulic radius, so the equations would be same!!

Swati Neogi:

1. I heard about ur BTP. 10 min discussion on that

2. Names of electives and why I wrote non dept electives first? Fundae i am using in my btp....mass, heat, fluid, catalyst, reaction, polymers etc
 3. Knudsen diffusivity, applicability/necessary condition?
 4. Theory's of mass transfer? When are they applicable and wat are the inter theory differences
 5. 2 film theory and its application
 6. coke particle, O₂ comes CO, CO₂ goes. It is counter current mass transfer n non equal molar.
 7. for all the above questions on theories et al, she never named them, she just gave me practical situations and wanted me to tell her which theory was applicable, after that we went into details of the theory.

SDe:

1. congoes for the award. how is IIM A, who all got the award etc etc
 2. what is hasian matrix? <told me he was sure i had studied it in some course, which i replied was obviously the one taught by him >
 3. Why do we use integral methods to solve PDEs?
 4. You never come to my class, how would u answer the qns!! Why don't you ever attend my class? <the answer is pretty obvious and he realised i m no use in maths>
 5. wat's euler's n stokes equation
 6. why do we use psi -- stream function?
 7. few more questions to the rapid fire round, my answers to most of which were either pass, or patani or suna nahin , or no idea :)

Somnath Ganguly

He started of by asking where I was placed and whether I planned to do an MBA and such questions.

1) What is rotameter? Explain its working along with the force balance equation.
 2) Unit of heat transfer coefficient, mass transfer coefficient, diffusivity.
 3) What is a humidifier? Give a practical example.
 4) Explain working of centrifugal pumps.
 SNG was very peace

BC Meikap

1) Unit of rate constant.
 2) Explain McCabe Thiele method in details. How do we calculate min reflux ?
 3) What is NPSH? What do you mean by cavitation?

Then he started asking weird questions. He asked me that , say, there is a water supply line in Midnapore which is powered by a pump in Kharagpur. Then how would i check if there is cavitation? It took me 5 mins to understand what he meant. Told him that I'd check the flow rate or the power intake for the pump, a lower flow rate or a higher power intake usually means there is cavitation.

Sudarshan Neogi

He asked the most number of arbit questions.

1) Why do you think that there is recent craze about nano-materials?
 2) What would you choose if you are given 1 gm of nano-material and 1 gm of micro-material of the same substance for conduction a reaction?
 3) Why do you think that it is important to go to even smaller levels than nano in the future?
 4) Growth of yeast in fermenter.

Then he asked about CPT and i said i had't read a word about cpt!! He said that i played the yorker well but i got out on a full-toss. I'm still trying to figure out what this joke meant.

RM

Rm was very peace. He asked me my favourite subject. I said Fluid Mechanics. He told me that he would ask conceptual questions only.

- 1) Which fundamental law is Navier Stoke's Equation based on?
- 2) What are the 7 fundamental laws in Chemical Engineering?
- 3) In the NS equation, what are the body force and surface force terms?
- 4) What is advection?
- 5) Why is it that for a rigid body we use the team acceleration only, but in case of a fluid we use the term " Substantial Acceleration" ?
- 5) While heating water in a pan, what is the direction of movement of heated water molecules when :
 - a) The pan is made of iron;
 - b) The pan is made of glass.
- 6) Explain how path lines and streak lines can be different for an unsteady flow of a fluid.
- 7) Explain how streamlining an object reduces the wake formation due to pressure losses.

GH

Almost same as Achal.

He also asked which mode of heat transfer dominates in this room in which you are sitting from the black board to the opposite wall ? Give approximate percentages of each mode of HT ?

What is Film Theory ?

Sonali

1. What is elementary reaction.
2. Half life fowr 1st order.
3. Some questions on Plug Flow & CSTR
4. Auto Catalytic Reactions and reactor combination you would use in any such case
5. Why the names CSTR & PFR

Gargi Das

1. Centrifugal pumps, NPSH, Cavitation, Characteristics curve
2. Fugacity. what does a pressure gauze measure
3. When would NPSH be same for both Co & Counter Current
4. Fugacity Coefficient, Activity Coeff, Compressibility factor and its graph

S ray

1. LMTD
2. NPSH available and required
3. Give 2 practical examples when you can not calculate LMTD (indeterminate form)
4. Feed Forward and Feed Backward Controllers
5. How to measure temperature of a furnace ?
6. Cavitation in pumps

Swati Neogi:

1. Assumption in PFR.
- 2 Difference between PFR and CSTR.
- 3 Type of diffusion in Distillation column.
4. How to know whether the diffusion process is counter, counter equi-molar, A thru non-diffusing B
5. Film theory and different mass transfer coefficient.
6. What is NS eqn and its origin?

DDK

1. Job kahan lagi? kitna package hain? job location? Aage kya karoge? then gave me some random funda about life and corrupt system in India.
2. Intern kahan ki thi? On hearing Paris, he was like "Oh I know what you would have done in Paris :P"
3. Tell me all the eqn you heard while studying packed bed?
4. Difference between regular and random packing
5. asked me to find effective diameter of a sphere and a cube of dimension D.

SDE

1. Do you smoke? I said yes! sometimes. Ohk then tell me is the smoke of a cigar a streak line, streamline or a pathline.
2. difference between Nu and Bi
3. Where are eddies formed near the surface or the bulk of it and why?
4. What is Euler and Stokes eqn and how are they derived from NS eqn.
5. How many "saurav" are there in your batch?

DS

1. Asked me to draw the temp profile for a system with uniform heat gen term after it attains steady state.
2. If the two walls are insulated then what would be the profile. If one is insulated what would be the profile?
3. How many methods we have studied to find a soln of PDE.
4. What is the funda to convert the indefinite Fourier Tr to definite Fourier Tr?
5. How to solve a system with an advancing solidification front.
6. Give some real life examples of such a system?

BC Meikap

- 1) what do you mean by relative volatility and how it is calculated directly?
- 2) how will you find the dia of distillation tower
- 3) characteristic eq. of PFR
- 4) then he asked about some pollutants in fertilizer industry...

Sudarshan neogi:

almost same as Sagnik's GV

in addition he asked to write any reaction in biochemical eng. and also name 2-3 micro organisms that are used.

RM

he asked me any subject that I preferred : I said Heat Transfer

- 1) he asked about natural convection and forced convection
- 2) what dimensionless number gives relation between thickness of momentum boundary layer and thermal boundary layer
- 3) he asked van der Waals equation of state and also to explain critical point
- 4) write Navier-Stokes equation and tell the convection and conduction terms
- 5) what is substantial derivative and where it is used?
- 6) what is difference between acceleration of a rigid body and a fluid stream
- 7) what are streak lines

S ganguly :

- 1) what is film theory and what is advantage of using it
- 2) units of diffusivity, viscosity, conductivity,
- 3) how is pressure drop in packed column calculated
- 4) principle of working of rotameter
- 5) what is major difference between reciprocating and centrifugal pump, then he asked about characteristic curve and NPSH, cavitation

6) Dittus Boelter equation

Few additions.

DM:

1. What is a transfer function, How to you check the stability of a control system
2. Name few equipment for crushing(jaw crusher, ball mill etc.) How do we find the energy required for crushing(any law say, rittinger`s), then how do we find the Diameter used in rittinger`s(screening), what is mesh number,
3. About ball mill, Is there any limit on RPM in ball mill(explained critical rpm).
4. What is view factor(radiation), asked to calculate view factors $F_{11}, F_{12}, F_{21}, F_{22}$ for two concentric spheres

Saikat:

He bought Galaxy Tab, Made a Memo having 6 question, Gave a answer sheet to write ans to them, meanwhile he kept staring at my answer sheet and was smiling in his usual way :P

1. Distillation is heat transfer or mass transfer.
2. Unsteady state mass balance for PFR
3. Define Mass, Knudsen and eddy Diffusivity. compare the magnitude of three.

Deshpande.

1. T-x-y diagram, actually made the plot and asked what are x and y axis. why to we get this type of curve
2. draw McCabe-Thiele construction, showed three trays on that, and digged that completely, how can these line represent no. of trays, what does horizontal and vertical lines represent.(horizontal shows the equilibrium on a tray), on vertical lines who can x_1, y_2 be same (because the liquid on a tray is basically the vapor coming from the tray just above)

Sudarshan Neogi

- What do you know about nanotechnology
- Stages in fermentation process
- Tell me everything you know about naphtha (told him I don't know CPT ask anything else)
- Why didnt you study CPT, thats a shame

BCM

- What is diesel index
- What is fcc
- Lots of question related to petrol and diesel, and terms I never heard before

RM

- What is advection
- Give examples of body force and surface force
- In capillary water rises and mercury sinks why
- Petrol is characterized by which property
- Components of LPG
- He concluded by saying" You don't deserve to pass out"

SNG

- What is your fav subject(Transport Phenomenon)
- Derive the expression for the efficiency of fin, assume everything you want
- In winter why does our nose and ear get cold (coz ear and nose act as fin)
- Any other subject(Fluid flow)

- What is vena contracta
- Derive the expression of flow rate as function of height in a rotameter

Jayanta:

1. Laws of thermodynamics with their significance
2. What is eqn of state?? give examples
3. Whats the difference b/w ideal gas eqn of state and VdW EoS??? Explain using a diagram the correction factors involved.
4. Ficks Law

Sudipto:

1. Whats a P - Controller?
2. Why can't it eliminate the error or why there is an offset present??
3. How can the offset be eliminated?? (I said using a PI controller)
4. What exactly does PI controller does that eliminates offset???

Kundu:

1. Fav Subject: I replied fluid mech and heat transfer.
2. he then asked why not mass transfer??? i said i didn't study it that well.
3. He started by asking me Fick's Laws.
4. Distillation column operation and q values.
5. Nucleation boiling and film condensation
6. Work Index, Kicks Law with equation
7. First Law of Radiation (I told him there's no thing as a First Law; he frowned :P and then i explained him Stefan- Boltzmann Law)
8. What is View Factor??

SDG:

1. various unit operations involved in a refinery
2. how does one rate a pump??
3. diffusivity from fick's Law, its subscript and its significance
4. what are Na and Nb in Ficks Law
5. Bernoulis Eqn. in terms of various heads and its assumptions
6. Water has viscosity , then how is it that we apply Bernoulli's Principle to it?

My GV was a little offbeat.

I was the last in the group, hence last student for all the profs.

1) JKB

- Hello Rohit, how was ChemInsight, thanks for the memento you gave me ! (i just smiled)
- okay i know you well, i am not going to ask you any simple questions. o.O
- I will ask you all the questions that one one answered till now... are you comfortable with that?
<i said yes sir, i am ready to try>
- I have two rods, how will you connect them, don't answer flanges, i will not ask if it was this simple
- I have a stream and a reactor, name the joint that i will used to connect them, Hint: 90 degree connection
- do you know quith flow ??? i said yes sir, he asked me .. are you sure ?! ... i said - obviously sir, why do you doubt.
- he said okay if you know then i am not asking question on it. <dafuq moment>
- He said, i will make this **viva** more challenging now, he called RPM. He said i will ask the same question to both of you, lets make it a competition.

- What mechanism you will use if you need to pump a fluid which has low discharge but extremely high pressure. he sent RPM back and was staring at me for the answer.
- After my answer, he called RPM, and told me i think he tried googling the answer (we were in cape lab :D)
- Then he asked okay, what will you use if its the other way round, high rate, low pressure
- okay i am done now, he then wanted to discuss his son's PHD offer from a university but got a call and left. :P

2) Padbhnaban

1. So rohit, what are your plans after passing out, on hearing about SLB he was like... oh the previous student also is joining the same company, that great (it was pranita)
2. why are you not interested in doing MS/PHD
3. what does SLB do ? exactly ? why did you get a PPO ?
4. Do you know about distillation columns
5. its has something at its top right !? what is it called. (He was looking for the answer Reflux Drum, my first guess was- roof of the building sir o.O)
6. okay so what's the purpose of this reflux drum. why do we use it.
7. what if i am not interested in using this drum and just simply use a valve to redirect the condensed liquid back in the column.
8. will that be okay ? if yes why ? if no why ?
9. there is one more purpose of reflux drum, can you tell what ?
10. how can you measure the pressure in a column, now that you have measured it how do you plan to control it, you just didnt measure the pressure for fun purpose, ins't it ! ;)
11. i answered that i will use a vent, he said- SLB won't be very happy if you plan to go there and vent out all their valuable fuel into the atmosphere. :P :P
12. i tried confusing him giving random fundas... but he was just not convinced. then he asked me to relate it to reflux drum
13. what's eddy diffusion ? have you ever seen eddies ??? if yes where ?
14. what comes to your mind when i say eddy... (i did rafting recently ... eddies was all over the place ... he was happy)
15. told me stories of his adventure trips then
16. more questions on eddies, equations, how do you solve them
17. MT lab ka fav exp and why ?
18. i give you two rods - one is made of iron and other of wood, they have same weight, same color, same texture. i now blindfold you. tell me which one is iron and which one is wood. (He then threw 2 pens in front of me to give me a feel)
19. You are allowed to do whatever you want with them, (Hint : Don't think of answering i will throw it on the ground ... the sound will tell me which one's which, that was my first ans... he just started laughing.... thoda chemical engineer type socho is what he said ;))
20. some questions on thermo
21. do you know Bernoulli theorem, pranita just told me that it cannot be used for gases. what's your take. ?
22. How are you feeling now.... you are about to pass out right ?! in the end he offered me mazzza to drink :D :D

3) New Prof - Prof Amit (i am still not sure what his name is)

RPM told me his name was prof raj kumar, so i greeted him as prof kumar.

he gave me a strange look. ... he then asked do you know me ? - i gave a blank look

- how were your previous 2 vivas... i am going to be tough to impress.
- do you want me to ask you questions on fluids, (i said - okay sir, go on) ? are you sure ? <everyone was in KBC mood... are you sure.. lock kar diya jaaye ... haain ?! >
- explain to me why do every now and then create dimensionless numbers.... ??

- i gave him a extremely long answer... i was not sure what he was asking so tried to confuse him
- he was clever... he was noting points while i was blabbering.
- he pointed out... based on what you have said- i can conclude the following
- do you agree... well it was clearly wrong :-o , i tried convincing him that what his interpretation was wrong... i never said that :P
- he then asked...if two fluids have same Re no, what can you say about them
- okay rohit, do you drink ? o_O :-O
- oh sorry, i meant do you drink tea ? .. anyway now that i have asked.. do you drink alcohol ?
- do you prefer milk in your tea? what is the difference between the two
- okay so lets say one day you are preparing tea, you have the black tea ready and you are about to add milk in it. your roommate calls you and you have to leave now... now tell me rohit what will you prefer - 1) you add the milk, you go help him and come back and drink it. or 2) you will leave without adding milk, will come back and add milk later and consume instantaneously ?
- i was totally confused first what he wanted me to do with such a question... was he even serious ?
- i asked him to repeat in short
- it bought me some time to think and answer correctly ! :)
- why is kgp so humid. what are possible options to bring temp down..
- what type of cooling devices will fail to work here.. and why
- can i apply your dimensionless number logics to gases too?
- a gas and liquid has same Re, comment
- i answered that gasses are compressible, behaviors is different
- he changed the question then - and ideal gas and liquid has same Re, comment <trolled>
- rotatmeter and working
- have you read reaction engineering, what all dimensionless numbers are used in it.
- which number has reaction rate as a term in it.
- i made a random guess... pecklet number...saala sahi ho gaya...so asked me the expression ...i told i forgot, asked me the significance, then asked okay... what is it used for.
- he said- you know which number... but you know very little about the number.. strange boy.
- are you happy with you GV ! ?
-
- 1.) Explain the significance of NS equations and explain the terms.
- 2.) What does scaling mean? Why do you use scaling?
- 3.) What is inviscid flow? Practical examples.
- 4.) The above discussion led questions no Euler Equation.
- 3.) Discussion over thermal(Dt) and momentum boundary layer(Dm).
- 4.) Draw bl over Semi-infinite plate. Which one will be thicker, Dt or Dm? (Ans-Pr)?
- 5.) What thermodynamic cycles do you know?
- 6.) What is refrigeration?
- 7.) Questions based on working of AC
-
-
-
- JKB:
-
- He told me that he will not ask me reaction engineering questions.
-
- 1.) What are the different types of pumps?
- 2.) He made two pipes and asked me how will you join them?
- 3) What are the different types of joints?
- 4.) Draw boiling curve, explain nucleate and pool boiling.
- 5.) Explain types of crushers, 3 laws of crushing, work index, mesh no.
- 6.) Characteristic curve of pumps, design point.
-
-
-
- Padmanaman:

-
- 1.) Why do you use reflux drum? Then why not simply use a vent instead of using a reflux drum.
- 2.) Bernoulli's equation, what are the assumptions?
- 3.) Can it be used for gasses? If yes then where and if no then why not?
- 4.) How will you find actual no of trays?
- 5.) If you use Murphree efficiency instead of overall efficiency will the no of trays come out to be more or less?
- 6.) How will you find the no of trays using Murphree efficiency?
- 7.) What will be the case if you use point efficiency?
- 8.) Stoke's law discussion
-

JC:

- 1) So Adarsh, are you going home this summer ?
- 2) When told I didn't get the reservation, and fight for tatkal...he said you can always opt for a flight...then asked on what principle aeroplane flies (explain with the diagram of the wing with air flow pattern)
- 3) Questions on extraction and leaching and examples for both.
- 4) Can benzene be used as solvent for extraction of toluene, why or why not ?
- 5) Laws of thermodynamics
- 6) Derivation for Batch, PFR and CSRT model

Kundu:

- 1) Have you been placed, what's the package like, do you want to be there, what's the purpose of joining bonus?
- 2) What is equivalent length and characteristic length?
- 3) Prandtl number and Nusselt number with its physical significance
- 4) Units of heat transfer coeff and thermal conductivity
- 5) Dittus-Boelter equation and its physical significance
- 6) Work index definition, write the equation...where does the value 1.46 come from
- 7) Bhaat session : Will u continue in reliance or go for higher studies, why UPSC, would u like to work under a businessman or an uneducated politician, why does people from UP always give preference to power etc etc.

Sudipto:

- 1) Have u been placed...exactly how many of u are in reliance ?
- 2) Nusselt no and its physical significance
- 3) Total and minimum reflux
- 4) What is an offset, what is tau, where does the value 63.2 come from?
- 5) Draw energy balance diag of rotameter and explain the principle and working?
- 6) What will happen if we invert the rotameter...will it work....what changes will be required?

SDG:

- 1) Have u been placed...why parental pressure...u r mature enough to take decisions.
- 2) When I say fluid dynamics what is the first thing that comes to ur mind
- 3) I said boundary layer and after that it was complete disaster....cant remember questions
- 4) Some question on tensor
- 5) Why a drop of liquid tends to be spherical
- 6) Coulomb's law, what is the name of coeff, is it same in all the mediums