# University of Mumbai
# Online Examination 2020

Program: BE Chemical Engineering

Curriculum Scheme: Revised 2012

Examination: Final Year Semester VIII

Course Code: CHE805

Course Name: Advanced Transport Phenomenon

Time: 1 hour Max. Marks: 50

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Note to the students: - All Questions are compulsory and carry equal marks.

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|---|---|
| Q1. | Hydrodynamic boundary layer thickness in momentum transfer, local heat transfer coefficient and local mass transfer coefficient are directly proportional |
| Option A: | Square of distance |
| Option B: | Square root of distance |
| Option C: | Distance |
| Option D: | Cube root of distance |
| | |
| Q2. | Reynolds analogy is applicable only for |
| Option A: | Turbulent flow |
| Option B: | Laminar flow |
| Option C: | Transient flow |
| Option D: | Laminar and turbulent flow |
| | |
| Q3. | Reynolds number is ___ |
| Option A: | Inertial force / viscous force |
| Option B: | inertial force / gravitational force |
| Option C: | buoyancy force / viscous force |
| Option D: | Inertial force / buoyancy force |
| | |
| Q4. | The unit of momentum is _____ |
| Option A: | kg |
| Option B: | m/s |
| Option C: | kg.m/s |
| Option D: | kg/m.s |
| | |

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|---|---|
| Q5. | The momentum flux is _____ |
| Option A: | Momentum / time .area |
| Option B: | momentum / time |
| Option C: | momentum / area |
| Option D: | (momentum . velocity) / (time. area) |
| | |
| Q6. | What will be the velocity of the fluid in contact with the upper plate? If water flows between two plates of which the upper one is stationary and the lower one is moving with a velocity V. |
| Option A: | V |
| Option B: | V/2 |
| Option C: | 2V |
| Option D: | 0 |
| | |
| Q7. | Which one of the following is not a unit of dynamic viscosity? |
| Option A: | Pa-s |
| Option B: | $N\text{-}s/m^2$ |
| Option C: | Poise |
| Option D: | Stokes |
| | |
| Q8. | Two horizontal plates placed 250mm have an oil of viscosity 20 poises. Calculate the shear stress in oil if upper plate is moved with velocity of 1250 mm/s. |
| Option A: | 20 $N/m^2$ |
| Option B: | 2 $N/m^2$ |
| Option C: | 10 $N/m^2$ |
| Option D: | 200 $N/m^2$ |
| | |
| Q9. | The velocity distribution for fluid flow over a flat plate is given by $u=2y-6y^2$ in which u is the velocity in metre per second at a distance of y metre above the plate. Determine the shear stress at y = 0.15m.Take dynamic viscosity of fluid as 8.6 poise. |
| Option A: | 0.172 $N/m^2$ |
| Option B: | 0.344 $N/m^2$ |
| Option C: | 0.086 $N/m^2$ |
| Option D: | 0.272 $N/m^2$ |
| | |
| Q10. | With increase in temperature, the thermal conductivity of most liquids |
| Option A: | Increases |
| Option B: | Decreases |
| Option C: | Remain same |
| Option D: | First increases upto a certain temperature and then becomes constant |
| | |
| Q11. | What is the unit of thermal conductivity ? |

| | |
|---|---|
| Option A: | W/m.K |
| Option B: | W/m2•K |
| Option C: | W/m |
| Option D: | W |
| | |
| Q12. | The unit of heat transfer co-efficient is |
| Option A: | $W/m^2$•K |
| Option B: | W/s |
| Option C: | W |
| Option D: | W/m.K |
| | |
| Q13. | Heat flux through several resistances in series is analogous to the current flowing through several |
| Option A: | Resistances in parallel. |
| Option B: | Capacitors in series. |
| Option C: | Resistances in series. |
| Option D: | Impedance in series |
| | |
| Q14. | For heat flow through very thick walled cylinder, use.....mean radius |
| Option A: | Arithmetic |
| Option B: | Logarithmic |
| Option C: | Geometric |
| Option D: | Consulted |
| | |
| Q15. | Thermal diffusivity is given by |
| Option A: | Cp/k |
| Option B: | h/Cp |
| Option C: | k / ρCp |
| Option D: | PCp |
| | |
| Q16. | Shell energy balance is made over a thin slab or shell which is ----- |
| Option A: | Parallel to the direction of the heat flow |
| Option B: | Perpendicular to the direction of the heat flow |
| Option C: | At an angle of 30 degree to the direction of heat flow |
| Option D: | At an angle of 45 degree to the direction of heat flow |
| | |
| Q17. | Extended heat transfer surface like fins are used to increase the heat transfer rate. Fin efficiency is defined as the ratio of heat transferred across the fin surface to the theoretical heat transfer across an equal area held at the |
| Option A: | Surrounding temperature. |
| Option B: | Average temperature of the fin. |
| Option C: | Temperature of the fin end. |
| Option D: | Constant temperature equal to that of the base |
| | |
| Q18. | Microscopic balances can be applied for |

| | |
|---|---|
| Option A: | Medium scale description |
| Option B: | Larger scale description |
| Option C: | Broad scale description |
| Option D: | Smaller scale description |
| | |
| Q19. | Diffusion co-efficient in molecular diffusion is estimated by |
| Option A: | Daltons law |
| Option B: | Diffusion law |
| Option C: | Ficks law |
| Option D: | Fourier law |
| | |
| Q20. | Fenske equation determines the |
| Option A: | maximum number of ideal plates |
| Option B: | height of the distillation column |
| Option C: | minimum number of theoretical plates |
| Option D: | optimum reflux ratio |
| | |
| Q21. | Diffusion is a process of |
| Option A: | movement of molecules from higher concentration to lower concentration |
| Option B: | movement of molecules through a semipermeable membrane |
| Option C: | rarefaction of particles |
| Option D: | accumulation of molecules on a solid surface |
| | |
| Q22. | Molecular diffusion is analogous to |
| Option A: | Convective heat transfer |
| Option B: | Radiation in heat transfer |
| Option C: | Conduction in heat transfer |
| Option D: | Convective mass transfer |
| | |
| Q23. | Fick's first law of Diffusion for the Z direction is |
| Option A: | JA = -DAB (dCA/dt) |
| Option B: | JA = -DAB (dCA/dZ) |
| Option C: | $JA = -D_{AB} (d^2CA/dZ^2)$ |
| Option D: | $JA = -D_{AB} (d^2CA/dt^2)$ |
| | |
| Q24. | Peclet number in mass transfer is |
| Option A: | Re.Pr |
| Option B: | Re/Pr |
| Option C: | Re.Sc |
| Option D: | Re/Sc |
| | |
| Q25. | The dimension of diffusion coefficient is given by |

| | |
|---|---|
| Option A: | $M\ L\ T^{-2}$ |
| Option B: | $L^{2}\ T^{-1}$ |
| Option C: | $L\ T^{-1}$ |
| Option D: | $M\ L^{-2} T$ |

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| Question | Correct Option (Enter either 'A' or 'B' or 'C' or 'D' |
|---|---|
| Q1. | B |
| Q2. | A |
| Q3. | A |
| Q4 | C |
| Q5 | A |
| Q6 | D |
| Q7 | D |
| Q8. | C |
| Q9. | A |
| Q10. | B |
| Q11. | A |
| Q12. | A |
| Q13. | C |
| Q14. | B |
| Q15. | C |
| Q16. | B |
| Q17. | D |
| Q18. | D |
| Q19. | C |
| Q20. | C |
| Q21. | A |
| Q22. | C |
| Q23. | B |
| Q24. | C |
| Q25. | B |

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