

Question Paper Preview

Notations :

- 1.Options shown in green color and with ✓ icon are correct.
- 2.Options shown in red color and with ✗ icon are incorrect.

Question Paper Name:	Chemical Engineering 28th May 2018 Shift1
Subject Name:	Chemical Engineering
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Magnifying Glass Required?:	No
Ruler Required?:	No
Eraser Required?:	No
Scratch Pad Required?:	No
Rough Sketch/Notepad Required?:	No
Protractor Required?:	No

Display Number Panel:	Yes
Group All Questions:	No

Question Number : 1 Question Id : 5113463721 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Let A be a square matrix and A^T denote the transpose of A.If $AA^T = A^T A = I$ (Unit matrix). then A is called

Options :

1. ✗ Skew matrix
2. ✗ Hermitian matrix
3. ✓ Orthogonal matrix
4. ✗ Zero matrix

Question Number : 2 Question Id : 5113463722 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The Eigen values of $A = \begin{bmatrix} 1 & 2 \\ 3 & 2 \end{bmatrix}$ are

Options :

1. ✖ 1, 4
2. ✔ -1, 4
3. ✖ 1, -4
4. ✖ -1, -4

Question Number : 3 Question Id : 5113463723 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

If $x = 2e^{-t}$, $y = 4e^t$, then $\frac{dy}{dx} =$

Options :

1. ✖ $-2e^{-t}$
2. ✖ $2e^{-2t}$
3. ✖ e^t
4. ✔ $-2e^{2t}$

Question Number : 4 Question Id : 5113463724 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

If $f(x) = x^2 - 5x + 7$ in $[2, 3]$ satisfies all the conditions of Rolle's Mean Value Theorem, then the value of 'c' of the Mean Value Theorem is

Options :

1. ✔ $\frac{5}{2}$
2. ✖ $\frac{2}{5}$
3. ✖ $\frac{-5}{2}$

4. ✖ $\frac{-2}{5}$

Question Number : 5 Question Id : 5113463725 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

If $z = u^2 + v^2$ and $u = t^2$, $v = 2at$ then $\frac{\partial z}{\partial t} =$

Options :

1. ✖ $4at$

2. ✖ $4a^2t+2$

3. ✔ $4a^2t(t^2 + 2)$

4. ✖ a^2t

Question Number : 6 Question Id : 5113463726 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The value of the integral $I = \int_0^{\frac{\pi}{2}} \frac{1}{1+\cot x} dx$ is

Options :

1. ✖ $\frac{\pi}{2}$

2. ✔ $\frac{\pi}{4}$

3. ✖ $\frac{\pi}{6}$

4. ✖ $\frac{\pi}{8}$

Question Number : 7 Question Id : 5113463727 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The directional derivative of $f(x, y, z) = xy + yz + zx$ at $(1, 2, 0)$ in the direction of $\hat{i} + 2\hat{j} + 2\hat{k}$ is

Options :

1. ✓ $\frac{10}{3}$

2. ✗ $\frac{1}{3}$

3. ✗ $\frac{5}{3}$

4. ✗ 1

Question Number : 8 Question Id : 5113463728 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The general solution of $(e^y + 1) \cos x \, dx + e^y \sin x \, dy = 0$ is

Options :

1. ✗ $e^y \sin x = c$

2. ✗ $e^y \sin x + 1 = c$

3. ✓ $(e^y + 1) \sin x = c$

4. ✗ $(e^y + \sin x) + 1 = c$

Question Number : 9 Question Id : 5113463729 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The particular integral of $(D^2 - D - 2)y = 3e^{2x}$ is

Options :

1. ✓ xe^{2x}

2. ✗ $1 + xe^{2x}$

3. ✗ $x^2 e^{2x}$

4. ✗ $x + e^{2x}$

Question Number : 10 Question Id : 5113463730 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The partial differential equation that can be formed by eliminating the arbitrary equations a, c from $\frac{x}{a} + \frac{y}{a} + \frac{z}{c} = 1$ is

Options :

1. ✓ $p - q = 0$

2. ✗ $\frac{1}{p} + \frac{1}{q} = 1$

3. ✗ $p + q = 1$

4. ✗ $\frac{1}{p^2} - \frac{1}{q^2} = xy$

Display Number Panel:

Yes

Group All Questions:

No

Question Number : 11 Question Id : 5113463731 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Consider the reaction scheme shown $A \xrightarrow{k_1} B \xrightarrow{k_2} C$. Both the reactions are first-order. The activation energies for k_1 and k_2 are 80 and 20 kJ/mol, respectively. To maximize the yield of B, it is preferable to use

Options :

1. ✗ CSTR and high temperature

2. ✓ PFR and high temperature

3. ✗ CSTR and low temperature

4. ✗ PFR and low temperature

Question Number : 12 Question Id : 5113463732 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

For a reversible exothermic gas phase reaction, $A + B \leftrightarrow C$, the equilibrium conversion will increase with

Options :

1. ✖ increase in pressure and increase in temperature
2. ✖ decrease in pressure and increase in temperature
3. ✔ increase in pressure and decrease in temperature
4. ✖ decrease in pressure and decrease in temperature

Question Number : 13 Question Id : 5113463733 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

For an ideal gas mixture undergoing a reversible gaseous phase chemical reaction, the equilibrium constant

Options :

1. ✖ is independent of pressure
2. ✖ increases with pressure
3. ✖ decreases with pressure
4. ✔ increases/decreases with pressure depending on the stoichiometric coefficients of the reaction

Question Number : 14 Question Id : 5113463734 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

As pressure approaches zero, the ratio of fugacity to pressure for a gas approaches

Options :

1. ✖ zero

2. ☒ unity

3. ☐ infinity

4. ☐ an indeterminate value

Question Number : 15 Question Id : 5113463735 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

For estimation of heat capacity of a solid compound, one can use

Options :

1. ☐ Clapeyron's equation

2. ☐ Gibb's equation

3. ☒ Kopp's rule

4. ☐ Trouton's rule

Question Number : 16 Question Id : 5113463736 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Enthalpy changes over a constant pressure path are always zero for _____ gas.

Options :

1. ☒ a perfect

2. ☐ an easily liquefiable

3. ☐ a real

4. ☐ an easily liquefiable and real gas

Question Number : 17 Question Id : 5113463737 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The work done in isothermal compression compared to that in adiabatic compression will be

Options :

1. ✗ more
2. ✓ more or less depending upon the extent of work done
3. ✗ same
4. ✗ less

Question Number : 18 Question Id : 5113463738 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Water is flowing under laminar conditions in a pipe of length L . If the diameter of the pipe is doubled, for a constant volumetric flow rate, the pressure drop across the pipe

Options :

1. ✗ decreases 2 times
2. ✓ decreases 16 times
3. ✗ increases 2 times
4. ✗ increases 16 times

Question Number : 19 Question Id : 5113463739 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The ratio of the thermal boundary layer thickness to the concentration boundary layer thickness is proportional to

Options :

1. ✗ Nu
2. ✓ Le
3. ✗ Sh
4. ✗ Pr

Question Number : 20 Question Id : 5113463740 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Potential flow can exist when

Options :

1. ✗ the influence of the solid boundaries is applicable
2. ✗ the fluid has finite viscosity
3. ✓ the fluid is incompressible
4. ✗ the fluid is non-Newtonian

Question Number : 21 Question Id : 5113463741 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The hydraulic radius for a square channel of D is equal to

Options :

1. ✗ D
2. ✗ $D/2$
3. ✓ $D/4$
4. ✗ $3D/4$

Question Number : 22 Question Id : 5113463742 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

A volute in a centrifugal pump performs the function of

Options :

1. ✗ Eliminating cavitation
2. ✗ Drawing liquid to the casing of the pump
3. ✓ Converting the velocity head of the liquid to pressure head

4. ✖ Minimizing shock loses

Question Number : 23 Question Id : 5113463743 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which of the following is an undesirable dynamic characteristic of an instrument?

Options :

1. ✖ Reproducibility
2. ✔ Time lag
3. ✖ Dead zone
4. ✖ Static error

Question Number : 24 Question Id : 5113463744 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which of the following temperature measuring instruments need not touch the object whose temperature is being measured?

Options :

1. ✔ Radiation / infrared pyrometer
2. ✖ Mercury in glass thermometer
3. ✖ Filled system thermometer
4. ✖ Thermoelectric pyrometer

Question Number : 25 Question Id : 5113463745 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which of the following controllers has maximum offset?

Options :

1. ✖ PID controller

2. ☒ P controller
3. ☐ PD controller
4. ☐ PI controller

Question Number : 26 Question Id : 5113463746 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Response of a linear control system for a change in load is called

Options :

1. ☐ transient response
2. ☐ sinusoidal response
3. ☐ servo problem
4. ☒ regulator problem

Question Number : 27 Question Id : 5113463747 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

If V is the volume of a stirred tank to which volumetric feed rate is F , the time constant for the system is

Options :

1. ☐ VF
2. ☐ $1/(VF)$
3. ☒ V/F
4. ☐ F/V

Question Number : 28 Question Id : 5113463748 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The principle of operation of refrigerator is based on

Options :

1. ✖ Third law of thermodynamics
2. ✔ Second law of thermodynamics
3. ✖ First law of thermodynamics
4. ✖ Zeroth law of thermodynamics

Question Number : 29 Question Id : 5113463749 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Baffles are used in heat exchangers in order to

Options :

1. ✖ increase the tube side fluid's heat transfer coefficient
2. ✖ Promote vibration in the heat exchanger
3. ✔ Promote cross flow and turbulence in the shell side fluid
4. ✖ Prevent shell expansion due to thermal effects

Question Number : 30 Question Id : 5113463750 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

For a given ambient air temperature with increase in the thickness of insulation of a hot cylindrical pipe, the rate of heat loss from the surface would

Options :

1. ✔ decrease
2. ✖ increase
3. ✖ first decrease and then increase
4. ✖ first increase and then decrease

Question Number : 31 Question Id : 5113463751 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

With increase in porosity, the thermal conductivity of a solid substance

Options :

1. ✖ increases
2. ✔ decreases
3. ✖ remains unchanged
4. ✖ may increase or decrease; depends on the solid

Question Number : 32 Question Id : 5113463752 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Minimum reflux ratio in a distillation column results in

Options :

1. ✖ optimum number of trays
2. ✔ minimum reboiler size
3. ✖ minimum condenser size
4. ✖ minimum number of trays

Question Number : 33 Question Id : 5113463753 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

When the feed to a distillation column is a saturated liquid, the slope of the feed line is

Options :

1. ✔ zero
2. ✖ one
3. ✖ infinity

4. ✖ 0.5

Question Number : 34 Question Id : 5113463754 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Fenske equation determines the

Options :

1. ✖ maximum number of ideal plates.
2. ✖ height of the distillation column
3. ✔ minimum number of theoretical plates
4. ✖ optimum reflux ratio.

Question Number : 35 Question Id : 5113463755 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The difference of wet bulb temperature and adiabatic saturation temperature of unsaturated mixture of any system is

Options :

1. ✔ +ve only
2. ✖ -ve only
3. ✖ zero
4. ✖ constant

Question Number : 36 Question Id : 5113463756 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

When the temperature and humidity of air is low, we usually use the following draft cooling tower is usually used

Options :

1. ✔ Natural

- 2. ✖ Forced
- 3. ✖ Induced
- 4. ✖ Cross flow

Question Number : 37 Question Id : 5113463757 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Pick out the wrong statement.

Options :

- 1. ✖ Lug supports are less expensive than other type of supports
- 2. ✖
A pipe is differentiated from a tube by the fact that a pipe has a greater wall thickness compared to the tube.
- 3. ✔ A reducer is used to change the direction of a pipe in a straight run.
- 4. ✖
The method of fixing tubes to a tube sheet by expanding is called 'tube rolling'.

Question Number : 38 Question Id : 5113463758 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

In a shell and tube heat exchanger for a given heat transfer surface area, smaller diameter tubes are favoured as compared to larger diameter ones ; because the smaller diameter tubes

Options :

- 1. ✖ are easier to clean
- 2. ✖ are less prone to fouling
- 3. ✔
can be fitted into a smaller shell diameter hence the cost of the heat exchanger would be less.
- 4. ✖ are non rusting

Question Number : 39 Question Id : 5113463759 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The distance between the centre of a rivet hole to the nearest edge of the plate is called.

Options :

1. ✗ Pitch
2. ✓ margin
3. ✗ back Pitch
4. ✗ cross pitch

Question Number : 40 Question Id : 5113463760 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Steam economy is defined as the amount of evaporation per unit amount of steam used, while the capacity is the total evaporation obtained per hour. Use of multiple effect in evaporation

Options :

1. ✗ increases capacity
2. ✗ increases economy
3. ✗ does not affect the capacity
4. ✓ increases economy and does not affect the capacity

Question Number : 41 Question Id : 5113463761 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which of the following is a detergent?

Options :

1. ✗ Benzene hexachloride
2. ✗ Cellulose nitrate
3. ✗ Polyvinyl chloride
4. ✓ Alkyl benzene sulphonate

Question Number : 42 Question Id : 5113463762 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Sodium carbonate (soda ash) is not used in the manufacture of

Options :

1. ✗ fire extinguishers
2. ✗ sugar
3. ✗ baking powder
4. ✓ detergents

Question Number : 43 Question Id : 5113463763 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

In the Solvay process, the product from the calciner is

Options :

1. ✓ light soda ash
2. ✗ dense soda ash
3. ✗ sodium bicarbonate
4. ✗ dehydrated soda ash

Question Number : 44 Question Id : 5113463764 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Wet chlorine gas produced during electrolysis of brine is dehydrated by

Options :

1. ✓ spraying 66° Be H_2SO_4 counter current to the flow of the gas
2. ✗ passing it through a bed of diatomaceous earth
3. ✗ passing it through a bed of silica gel.
4. ✗ Passing NaCl

Question Number : 45 Question Id : 5113463765 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Concentration of NaOH solution produced by diaphragm electrolytic cell is about _____ percent

Options :

1. ☒ 10
2. ☐ 25
3. ☐ 50
4. ☐ 98

Question Number : 46 Question Id : 5113463766 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

A “space time” of 5 minutes means

Options :

1. ☐ 100% conversion of the reactant is achieved in 5 minutes
2. ☐ One reactor volume of feed at specified conditions is processed in 5 minutes.
3. ☒ 5% conversion is achieved in one minute
4. ☐ 5% conversion is achieved in five minutes

Question Number : 47 Question Id : 5113463767 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

In most of the catalytic reactions , an inert carrier is used , whose primary function is to

Options :

1. ☐ to improve catalytic activity
2. ☐ to enhance reactor performance
3. ☐ to decrease the reaction temperature

4. ✓ to provide large surface area for the catalyst

Question Number : 48 Question Id : 5113463768 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

In solid catalysed reactions the diffusional effects are more likely to affect the overall rate of reaction for

Options :

1. ✓ fast reactions in catalyst of small pore diameter
2. ✗ fast reactions in catalyst of large pore diameter
3. ✗ slow reactions in catalyst of small pore diameter
4. ✗ slow reactions in catalyst of large pore diameter

Question Number : 49 Question Id : 5113463769 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The dispersion number for a CSTR is

Options :

1. ✗ zero
2. ✗ one
3. ✗ two
4. ✓ infinite

Question Number : 50 Question Id : 5113463770 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Knudsen diffusion which is a function of temperature (T) is proportional to

Options :

1. ✗ T
2. ✓ $T^{1/2}$

3. ✖ $1/T$

4. ✖ T^2

Question Number : 51 Question Id : 5113463771 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

A solid is transformed into vapour without going to the liquid phase at

Options :

1. ✖ below triple point only

2. ✖ any point

3. ✖ boiling point only

4. ✔ triple point only

Question Number : 52 Question Id : 5113463772 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which one is true for a throttling process?

Options :

1. ✔ The inversion temperature is different for different gases

2. ✖ The inversion temperature is same for all gases

3. ✖

The inversion temperature is the temperature at which Joule-Thomson co-efficient is infinite

4. ✖ A gas may have more than one inversion temperature

Question Number : 53 Question Id : 5113463773 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

A process is spontaneous at all temperatures if

Options :

1. ✖ $\Delta H > 0$ and $\Delta S < 0$

2. ✖ $\Delta H < 0$ and $\Delta S > 0$
3. ✔ $\Delta H > 0$ and $\Delta S > 0$
4. ✖ $\Delta H < 0$ and $\Delta S < 0$

Question Number : 54 Question Id : 5113463774 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

A equimolar mixture of gas containing CO_2 , H_2 , O_2 and N_2 has the average molecular weight equal to

Options :

1. ✖ 106
2. ✖ 53
3. ✖ 79.5
4. ✔ 26.5

Question Number : 55 Question Id : 5113463775 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Air is essentially a mixture of oxygen and nitrogen in the volume percent of 21 and 79 respectively. The weight percent of oxygen in air will be

Options :

1. ✖ equal to 21%
2. ✖ less than 21%
3. ✔ greater than 21%
4. ✖ equal to 79%

Question Number : 56 Question Id : 5113463776 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Axial flow pump is otherwise known as a

Options :

1. ✓ Propeller pump
2. ✗ Diffuser pump
3. ✗ Sump pump
4. ✗ Turbine Pump

Question Number : 57 Question Id : 5113463777 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

By measuring the pressure drop and volumetric flow rate through a tube of known length and diameter, the fluid viscosity can be calculated from

Options :

1. ✗ Fanning's equation
2. ✓ Hagen Poiseuille equation
3. ✗ Karman equation
4. ✗ Bernoulli's equation

Question Number : 58 Question Id : 5113463778 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

To avoid separation of flow in the divergence section of a venturimeter, the limiting cone angle for the section is

Options :

1. ✓ 8°
2. ✗ 12°
3. ✗ 15°

4. ✖ 18°

Question Number : 59 Question Id : 5113463779 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

For a particle settling in water at its terminal settling velocity, which of the following is true?

Options :

1. ✖ Buoyancy = weight + drag

2. ✔ Weight = buoyancy + drag

3. ✖ Drag = buoyancy + weight

4. ✖ Drag = weight

Question Number : 60 Question Id : 5113463780 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Size reduction of coarse hard solids using a crusher is accomplished by

Options :

1. ✖ attrition

2. ✔ compression

3. ✖ cutting

4. ✖ impact

Question Number : 61 Question Id : 5113463781 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

For a plug flow reactor, the time delay is

Options :

1. ✖ equal to half the residence time in the reactor

2. ✔ equal to the residence in the reactor

3. ✖ equal to twice the residence time in the reactor
4. ✖ not related to the residence time in the reactor

Question Number : 62 Question Id : 5113463782 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which of the following wavelength of the radiation is used in NMR

Options :

1. ✖ X-rays
2. ✖ infrared
3. ✖ microwaves
4. ✔ radio waves

Question Number : 63 Question Id : 5113463783 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The unit step response of the transfer function $\frac{2s-1}{(3s+1)(4s+1)}$ reaches its final steady state asymptotically after

Options :

1. ✖ a monotonic increase
2. ✖ a monotonic decrease
3. ✔ initially increasing and then decreasing
4. ✖ initially decreasing and then increasing

Question Number : 64 Question Id : 5113463784 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The time constant of a unity gain, first order plus time delay process is 5 min. If the phase lag at a frequency of 0.2 rad/min is 60°, then the dead time (in minutes) is

Options :

1. ✓ $5\pi/12$

2. ✗ $\pi/6$

3. ✗ $\pi/12$

4. ✗ $\pi/3$

Question Number : 65 Question Id : 5113463785 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Constantan is an alloy of

Options :

1. ✗ copper and aluminium

2. ✗ copper and chromium

3. ✓ copper and nickel

4. ✗ chromium and nickel

Question Number : 66 Question Id : 5113463786 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

A backward feed multiple effect evaporator is better than forward feed for concentrating cold feed, because it provides

Options :

1. ✓ higher economy only

2. ✗ lower capacity only

3. ✗ higher economy only and lower capacity only

4. ✗ lower economy

Question Number : 67 Question Id : 5113463787 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Boiling of milk in an open vessel is an example of _____ boiling

Options :

1. ☒ Film
2. ☐ sub-cooled
3. ☐ saturated nucleate
4. ☐ Sub-cooled & saturated nucleate

Question Number : 68 Question Id : 5113463788 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

In a co-current double pipe heat exchanger used for condensing saturated steam over the inner tube, if the entrance and exit conditions of the coolant are interchanged, then the rate of condensation will

Options :

1. ☐ increase
2. ☐ decrease
3. ☒ remain unchanged
4. ☐ either increase or decrease; depends on the coolant flow rate

Question Number : 69 Question Id : 5113463789 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

A wall has two layers of materials A and B; each made of a different material. Both the layers have the same thickness. The thermal conductivity of material A is twice that of B. Under the equilibrium, the temperature difference across the wall is 36°C . The temperature difference across the layer A is _____ $^{\circ}\text{C}$.

Options :

1. ✖ 6
2. ✔ 12
3. ✖ 18
4. ✖ 24

Question Number : 70 Question Id : 5113463790 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

In case of heat flow by conduction for a cylindrical body with an internal heat source, the nature of temperature distribution is

Options :

1. ✖ linear
2. ✖ hyperbolic
3. ✔ parabolic
4. ✖ cubic

Question Number : 71 Question Id : 5113463791 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

_____ columns are used for liquid dispersion in a continuous gas phase

Options :

1. ✔ Packed
2. ✖ Pulse
3. ✖ Bubble cap
4. ✖ Sieve plate

Question Number : 72 Question Id : 5113463792 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Air initially at 101.3 kPa and 40°C and with a relative humidity of 50%, is cooled at constant pressure to 30°C. The cooled air has a

Options :

1. ✖ higher dew point
2. ✖ higher absolute (specific) humidity
3. ✔ higher relative humidity
4. ✖ higher wet bulb temperature.

Question Number : 73 Question Id : 5113463793 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Separation of two or more components of a liquid solution cannot be achieved by

Options :

1. ✖ fractional crystallisation
2. ✖ liquid extraction
3. ✔ absorption
4. ✖ evaporation

Question Number : 74 Question Id : 5113463794 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

To increase the absorption factor, (where, G = gas flow rate, S = solvent flow rate)

Options :

1. ✖ increase both ' G ' and ' S '
2. ✖ decrease both ' G ' and ' S '

3. ✓ increase 'S' and decrease 'G'

4. ✗ increase 'G' and decrease 'S'

Question Number : 75 Question Id : 5113463795 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which of the following plays an important role in problems of simultaneous heat and mass transfer?

Options :

1. ✓ Lewis number

2. ✗ Schmidt number

3. ✗ Prandtl number

4. ✗ Sherwood number

Question Number : 76 Question Id : 5113463796 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

A 'rupture disc' is provided in chemical equipment as an accessory meant for

Options :

1. ✓ relieving excess pressure

2. ✗ creating turbulence

3. ✗ enhancing mixing rate

4. ✗ avoiding vortex formation

Question Number : 77 Question Id : 5113463797 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Value of Peclet number $= \infty$, is the representative of

Options :

1. ✗ laminar flow.

2. ✖ complete back mixing.
3. ✔ plug flow.
4. ✖ eddy diffusivity = 0.

Question Number : 78 Question Id : 5113463798 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Direct costs component of the fixed capital consists of

Options :

1. ✖ contingencies.
2. ✔ onsite and offsite costs.
3. ✖ labour costs.
4. ✖ raw material costs.

Question Number : 79 Question Id : 5113463799 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Out of the following, the depreciation calculated by the _____ method is the maximum.

Options :

1. ✔ diminishing balance.
2. ✖ straight line.
3. ✖ sum of the years digit.
4. ✖ sinking fund.

Question Number : 80 Question Id : 5113463800 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

For a given fluid, as the pipe diameter increases, the pumping cost

Options :

1. ✓ decreases.
2. ✗ increases.
3. ✗ remains the same..
4. ✗
may increase or decrease, depending upon whether the fluid is Newtonian or non-Newtonian.

Question Number : 81 Question Id : 5113463801 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Shaving soaps are

Options :

1. ✓
soft potassium soaps (potassium salt of fatty acid) with free stearic acid to give lather a lasting property
2. ✗
metallic soaps compounded with frothing agents
3. ✗
high free alkali soaps having excess of cane sugar and alcohol.
4. ✗
metallic soaps coated with oils

Question Number : 82 Question Id : 5113463802 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The most popular and common detergent i.e., alkyl benzene sulfonate (ABS) is a/an _____ detergent

Options :

1. ✗ Cationic
2. ✓ Anionic
3. ✗ Amphoteric
4. ✗ Semi polar

Question Number : 83 Question Id : 5113463803 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which of the following is the most adverse factor challenging the choice of mercury electrolytic cell process for the production of caustic soda?

Options :

1. ✖ High cost of mercury.
2. ✖ High specific gravity of mercury.
3. ✖ Non-availability of high purity mercury.
4. ✔ Pollution of water stream by mercury.

Question Number : 84 Question Id : 5113463804 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Fat splitting catalyst is

Options :

1. ✖ CaCO_3
2. ✔ ZnO
3. ✖ Al_2O_3
4. ✖ Fe

Question Number : 85 Question Id : 5113463805 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

When a catalyst increases the rate of forward reaction, the value of rate constant

Options :

1. ✔ increases
2. ✖ decreases to non-zero value
3. ✖ remain same

4. ✖ become zero

Question Number : 86 Question Id : 5113463806 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

In case of _____ reactions, the reaction rate does not decrease appreciably as the reaction proceeds

Options :

1. ✔ series

2. ✖ parallel

3. ✖ auto catalytic

4. ✖ catalytic

Question Number : 87 Question Id : 5113463807 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

A photochemical reaction is _____ light

Options :

1. ✔ used to convert heat energy into

2. ✖ accompanied with emission of

3. ✖ catalysed by

4. ✖ initiated by

Question Number : 88 Question Id : 5113463808 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which of the following is a controlling factor in very fast heterogeneous reaction?

Options :

1. ✔ Heat and mass transfer effects

2. ✖ Pressure
3. ✖ Temperature
4. ✖ Composition of reactant

Question Number : 89 Question Id : 5113463809 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Molecularity of a reaction

Options :

1. ✖ Is always equal to the overall order of reaction
2. ✖ May not be equal to the order of reaction
3. ✖ Can't have a fractional value
4. ✔ May not be equal to the order of reaction and cannot have a fractional value

Question Number : 90 Question Id : 5113463810 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Primary objective of using a bypass stream for a process is

Options :

1. ✖ to improve overall conversion
2. ✖ to increase product yield
3. ✔ to ensure better control over the process
4. ✖ to decrease product yield

Question Number : 91 Question Id : 5113463811 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The cox chart is based on

Options :

1. ✖ Clapeyron equation
2. ✖ Kirchoff's equation
3. ✔ Antoine equation
4. ✖ Kistyakowsky equation

Question Number : 92 Question Id : 5113463812 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

10 gms each SO_2 and CO_2 are filled to bottle no. 1 and bottle no. 2 respectively. Bottle no. 1 will contain

Options :

1. ✖ more molecules than bottle no. 2
2. ✔ less molecules than bottle no. 2
3. ✖ same number of molecules as bottle no. 2
4. ✖ double the molecules in bottle no. 2

Question Number : 93 Question Id : 5113463813 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

For normal liquids, the de Guzman Andrade equation relates

Options :

1. ✖ Variation of latent heat with temperature
2. ✖ Variation of specific heat with temperature
3. ✔ Variation of viscosity heat with temperature

4. ✖ Variation of thermal conductivity with temperature

Question Number : 94 Question Id : 5113463814 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The equivalent weight of H_3PO_4 is

Options :

1. ✖ 49
2. ✔ 98
3. ✖ 32.7
4. ✖ 65

Question Number : 95 Question Id : 5113463815 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

In Tyler series, the ratio of the aperture size of a screen to that of the next smaller screen is

Options :

1. ✖ $1/\sqrt{2}$
2. ✔ $\sqrt{2}$
3. ✖ 1.5
4. ✖ 2

Question Number : 96 Question Id : 5113463816 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The critical speed of the ball mill of radius R , which contains balls of radius r , is proportional to

Options :

1. ✔ $(R-r)^{-0.5}$
2. ✖ $(R-r)^{-1}$

3. ✖ $(R-r)$

4. ✖ $(R-r)^2$

Question Number : 97 Question Id : 5113463817 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

In constant pressure filtration

Options :

1. ✖ Resistance decreases with time

2. ✖ Rate of filtration is constant

3. ✖ Rate of filtration increases with time

4. ✔ Rate of filtration decreases with time

Question Number : 98 Question Id : 5113463818 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Energy requirement (per unit mass of material crushed/ground) is highest for

Options :

1. ✖ Jaw crusher

2. ✖ Rod mill

3. ✖ Ball mill

4. ✔ Fluid energy mill

Question Number : 99 Question Id : 5113463819 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Particles settling in the stokes's range, their terminal velocity depends on their particle diameter

(D_p) as

Options :

1. ✖ D_p
2. ✖ $(D_p)^{1/2}$
3. ✔ $(D_p)^2$
4. ✖ $1/D_p$

Question Number : 100 Question Id : 5113463820 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Working principle of radiation pyrometer is based on the

Options :

1. ✖ Wien's law
2. ✖ Kirchoffs law
3. ✔ Stefan-Boltzman law
4. ✖ Seebeck effect

Question Number : 101 Question Id : 5113463821 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

A proportional controller with a gain of K_c is used to control a first order process. The offset will increase, if

Options :

1. ✖ K_c is reduced
2. ✔ K_c is increased
3. ✖ integral control action is introduced
4. ✖ derivative control action is introduced

Question Number : 102 Question Id : 5113463822 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Routh test

Options :

1. ✖ criterion provides information about the actual location of roots
2. ✔ cannot be used to test the stability of a control system containing transportation lag
3. ✖ criterion is not applicable to systems with polynomial characteristic equation
4. ✖ cannot determine as to how many roots of the characteristics equation have positive real roots

Question Number : 103 Question Id : 5113463823 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

In a heat exchanger with steam outside the tubes, a liquid gets heated to 45°C , when its flow velocity in the tubes is 2 m/s. If the flow velocity is reduced to 1 m/s, other things remaining the same, the temperature of the exit liquid will be

Options :

1. ✖ less than 45°C
2. ✖ initially decreases and remains constant thereafter.
3. ✖ equal to 45°C
4. ✔ more than 45°C

Question Number : 104 Question Id : 5113463824 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

In case of a multi-pass shell and tube heat exchanger, the temperature drop in the fluid

Options :

1. ✔ and the wall are proportional to individual resistances

2. ✖ and the wall is not related.

3. ✖ and the wall is inversely proportional to the resistance across which the drop occurs.

4. ✖ and the wall is equal

Question Number : 105 Question Id : 5113463825 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Maximum water velocity in tubes of a 1-2 shell and tube heat exchanger may be around _____ metres/second.

Options :

1. ✖ 10

2. ✖ 30

3. ✖ 20

4. ✔ 1

Question Number : 106 Question Id : 5113463826 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The rate of emission of radiation by a body does not depend upon the

Options :

1. ✖ wavelength of radiation

2. ✖ surface temperature of the body

3. ✖ nature of the surface

4. ✔ shape and porosity of the body.

Question Number : 107 Question Id : 5113463827 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

In case of _____ boiling, the liquid temperature is below the saturation temperature and the boiling takes place in the vicinity of the heated surface

Options :

1. ✖ Nucleate
2. ✔ Local
3. ✖ Pool
4. ✖ Saturated

Question Number : 108 Question Id : 5113463828 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

As the reflux ratio in a distillation column is increased from the minimum, the

Options :

1. ✖ slope of the operating line in stripping section decreases
2. ✖ number of plates decreases very slowly first and then more and more rapidly
3. ✔ total cost first decreases and then increases
4. ✖ liquid flow increases while the vapour flow decreases for a system.

Question Number : 109 Question Id : 5113463829 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Tea percolation employs

Options :

1. ✖ liquid-liquid extraction
2. ✔ leaching
3. ✖ absorption

4. ✖ liquid-solid extraction

Question Number : 110 Question Id : 5113463830 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

In case of _____ distillation, a solvent is added to alter the relative volatility of the mixture to be separated

Options :

1. ✖ Molecular
2. ✖ Azeotropic
3. ✖ flash
4. ✔ extractive

Question Number : 111 Question Id : 5113463831 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Chemisorption compared to physical absorption has

Options :

1. ✖ lower adsorption rate
2. ✖ lower capacity of the solvent for the solute gas.
3. ✔ increased utilisation of stagnant zones of the liquid phase.
4. ✖ no change

Question Number : 112 Question Id : 5113463832 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

In which of the electric power generation system, the operating cost is minimum?

Options :

1. ✖ Thermal.

2. ✖ Nuclear.
3. ✔ Hydeoelectric.
4. ✖ Fast breeder reactor.

Question Number : 113 Question Id : 5113463833 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Fixed charges for a chemical plant does not include the

Options :

1. ✖ interest on borrowed money.
2. ✖ rent of land and buildings.
3. ✖ property tax, insurance and depreciation
4. ✔ repair and maintenance charges.

Question Number : 114 Question Id : 5113463834 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Pick out the wrong statement.

Options :

1. ✖
Debt-equity ratio of a chemical company describes the lenders contribution for each rupee of owner's contribution i.e., $\text{debt-equity ratio} = \frac{\text{total debt}}{\text{net worth}}$.
2. ✖
Return on investment (ROI) is the ratio of profit before interest & tax and capital employed (i.e. net worth + total debt).
3. ✔ Working capital = current assets + current liability.
4. ✖ Turn over = opening stock + production closing stock

Question Number : 115 Question Id : 5113463835 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The payback method for the measurement of return on investment

Options :

1. ✖ gives a correct picture of profitability.
2. ✖ underemphasises liquidity.
3. ✔ does not measure the discounted rate of return.
4. ✖ takes into account the cash inflows after the recovery of investments.

Question Number : 116 Question Id : 5113463836 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which of the following material is seldom used for pressure vessel construction?

Options :

1. ✔ Rimmed still
2. ✖ Mild steel
3. ✖ Killed steel
4. ✖ Semi-killed steel.

Question Number : 117 Question Id : 5113463837 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Salt is added in the kettle during soap manufacturing to separate

Options :

1. ✔ Soap from lye
2. ✖ Glycerine for lye
3. ✖ The metallic soap

4. ✖ The unsaponified fat from soap.

Question Number : 118 Question Id : 5113463838 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Nylon-6 is manufactured from

Options :

1. ✔ caprolactum.
2. ✖ adipic acid and hexamethylenediamine.
3. ✖ maleic anhydride and hexamethylenediamine.
4. ✖ sebasic acid and hexamethylenediamine.

Question Number : 119 Question Id : 5113463839 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Neoprene is a

Options :

1. ✖ monomer
2. ✔ synthetic rubber
3. ✖ polyester
4. ✖ polyamide

Question Number : 120 Question Id : 5113463840 Question Type : MCQ Option Shuffling : No Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Polymethyl methacrylate (PMMA) is known as

Options :

1. ✖ bakelite
2. ✖ teflon

3. ✓ perspex

4. ✗ nylon-6.