

Question Paper Preview

Subject Name: Chemical Engineering

Display Number Panel: Yes
Group All Questions: No

Question Number : 1 Question Id : 7621612041 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

If $A = \begin{bmatrix} 1 & 3 & -3 \\ 3 & 0 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 0 \\ -3 & 1 \\ 0 & 5 \end{bmatrix}$ then $AB =$

Options :

1. $\begin{bmatrix} -12 & -6 \\ 25 & 9 \end{bmatrix}$

2. $\begin{bmatrix} 3 & -9 & 0 \\ 0 & 0 & 25 \end{bmatrix}$

3. $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

4. $\begin{bmatrix} -6 & -12 \\ 9 & 25 \end{bmatrix}$

Question Number : 2 Question Id : 7621612042 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The value of $\lim_{x \rightarrow 0} \frac{e^{2x} - (1+x)^2}{x \log x}$ is

Options :

1. 0 (zero)

2. 1

3. -1

4. ∞

Question Number : 3 Question Id : 7621612043 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The value of the integral $\int_0^{\frac{\pi}{2}} \frac{\sin x - \cos x}{1 + \sin x \cos x} dx$ is

Options :

1. $\frac{1}{2}$
2. $\frac{\pi}{2}$
3. $\frac{\pi}{4}$
4. 0 (Zero)

Question Number : 4 Question Id : 7621612044 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The divergence of $f(x, y, z) = 3x^2i + 5xy^2j + xyz^3k$ at the point (1, 2, 3) is

Options :

1. 40
2. 80
3. 90
4. 100

Question Number : 5 Question Id : 7621612045 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The solution of the differential equation $\frac{dy}{dx} = \sqrt{4 - y^2}$ is $y =$
(where c is constant of integration)

Options :

1. $2 \sin(x + c)$
2. $2 \cos(x + c)$
3. $\tan(x + c)$
4. $\cot(x + c)$

Question Number : 6 Question Id : 7621612046 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The solution of the differential equation $(D^2 + 4)y = \sin 3x$ is

Options :

1. $y = c_1 \cos x + c_2 \sin 2x + \cos 3x$
2. $y = c_1 \cos x + c_2 \sin 2x + 5 \sin 3x$
3. $y = c_1 \cos 2x + c_2 \sin 2x + \frac{1}{5} \sin 3x$
4. $y = c_1 \cos 2x + c_2 \sin 2x - \frac{1}{5} \sin 3x$

Question Number : 7 Question Id : 7621612047 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Laplace Transform of $\sin t \cos t$ is

Options :

1. $\frac{1}{s+2}$
2. $\frac{1}{s^2+4}$
3. $\frac{s}{s+2}$
4. $\frac{s}{s^2+4}$

Question Number : 8 Question Id : 7621612048 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

If C denotes the unit circle $|z| = 1$ then $\int_C \frac{e^z}{z} dz$ over C is

Options :

1. 2π
2. $\frac{1}{2\pi}$
3. $2\pi i$
4. $\frac{1}{2\pi i}$

Question Number : 9 Question Id : 7621612049 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

If A and B are independent events and if $P(A) = 0.35$, $P(A \cup B) = 0.6$, then $P(B) =$

Options :

1. $\frac{5}{13}$
2. $\frac{7}{13}$
3. $\frac{9}{13}$
4. $\frac{11}{13}$

Question Number : 10 Question Id : 7621612050 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

If $f(x, y, z) = x^2 - y^2 + 4z$, then $\nabla^2 f =$

Options :

1. 0 (zero)
2. 1

3. $\frac{1}{2}$

4. 2

Display Number Panel:

Yes

Group All Questions:

No

Question Number : 11 Question Id : 7621612051 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Recycle stream is purged for

Options :

1. limiting the product formation
2. limiting the byproduct formation
3. limiting the inerts
4. limiting the rate of reaction

Question Number : 12 Question Id : 7621612052 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Caustic soda flakes obtained from a manufacturer are found to contain 60 ppm SiO_2 (Silica). Convert this impurity into weight %

Options :

1. 60%
2. 6%
3. 0.06%
4. 0.006%

Question Number : 13 Question Id : 7621612053 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Pure A in gas phase enters a reactor. 75% of this A is converted to B, through the reaction $A \rightarrow 2B$. Mole fraction of A in the exit stream is

Options :

1. $\frac{1}{2}$
2. $\frac{1}{3}$
3. $\frac{1}{6}$

4. $\frac{1}{7}$

Question Number : 14 Question Id : 7621612054 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Air has 21% and 79% of oxygen and nitrogen by volume respectively. What is the average molecular weight?

Options :

1. 29
2. 28.84
3. 29.3
4. 28

Question Number : 15 Question Id : 7621612055 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The second order system with transfer function $4/(s^2+2s+4)$ has a damping ratio of

Options :

1. 2.0
2. 4.0
3. 0.5
4. 1.0

Question Number : 16 Question Id : 7621612056 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The volume of oxygen at STP required for the complete combustion of 2 litres of CO at STP is

Options :

1. 0.5 litre
2. 1 litre
3. 2 litres
4. 4 litres

Question Number : 17 Question Id : 7621612057 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

1.2 gm atom of carbon and 1.5 gm mole of O_2 are reacted to give 1 gm mole of CO_2 . The % excess oxygen supplied is

Options :

1. 20
2. 25
3. 30
4. 40

Question Number : 18 Question Id : 7621612058 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

An organic compound is found to contain C= 54.5%, O= 36.4% and H= 9.1% by weight. Its empirical formula is

Options :

1. CHO_2
2. CH_2O
3. $\text{C}_2\text{H}_4\text{O}$
4. $\text{C}_3\text{H}_4\text{O}$

Question Number : 19 Question Id : 7621612059 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A flue gas has the following composition by volume measured at 760 mm Hg and 30°C ($\text{CO}_2 = 25.0$; $\text{CO} = 0.2$; $\text{SO}_2 = 1.2$; $\text{N}_2 = 68$; $\text{O}_2 = 5.6$)

The average molecular weight is _____.

Options :

1. 32.00
2. 33.42
3. 31.76
4. 30.26

Question Number : 20 Question Id : 7621612060 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The analysis of sewage gas sample from a municipal sewage treatment plant is given below on volume basis:

$\text{CH}_4 - 68\%$

$\text{CO}_2 - 30\%$

$\text{NH}_3 - 2\%$

Find the average molecular weight of gas.

Options :

1. 22.2
2. 23.8
3. 24.42
4. 26.78

Question Number : 21 Question Id : 7621612061 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A system receives 13.5 J of heat and at the same time work is transferred to the surroundings. Which of the following amount is possible?

Options :

1. 13.5 J
2. 20.0 J
3. 1 J

4. 14.5 J

Question Number : 22 Question Id : 7621612062 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

When the temperature of an ideal gas is increased from 27°C to 927°C, the kinetic energy will be

Options :

1. same
2. twice
3. eight times
4. four times

Question Number : 23 Question Id : 7621612063 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The fugacity of a component in a homogeneous solution is a function of

Options :

1. temperature only
2. pressure only
3. temperature, pressure and composition
4. temperature and pressure only

Question Number : 24 Question Id : 7621612064 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The number of degrees of freedom for a gaseous system consisting of CO, CO₂, H₂, H₂O and CH₄ in a chemical reaction (number of distinct reactions are two)

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 25 Question Id : 7621612065 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The Gibbs free energy change (ΔG) and equilibrium constant (K) for a chemical reaction are related by

Options :

1. $\Delta G = RT \ln K$
2. $\Delta G = -T \ln K$
3. $\Delta G = -RTK$
4. $\Delta G = -RT \ln K$

Question Number : 26 Question Id : 7621612066 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Wall friction for laminar tube flow is proportional to

Options :

1. viscosity
2. 1/ viscosity
3. square root of viscosity
4. viscosity²

Question Number : 27 Question Id : 7621612067 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Kinematic viscosity has a unit of

Options :

1. m/s
2. m/s²
3. m² /s
4. kg.m/s

Question Number : 28 Question Id : 7621612068 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Bernoulli's equation strictly applies to

Options :

1. compressible fluid
2. perfect fluid
3. turbulent fluid
4. gases only

Question Number : 29 Question Id : 7621612069 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

For laminar flow of Newtonian fluids in pipes, the ratio of average velocity to maximum velocity is equal to

Options :

1. 0.5
2. 1.0
3. 1.5
4. 2.0

Question Number : 30 Question Id : 7621612070 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A fluidized bed is formed when

Options :

1. Fluid friction is zero
2. Gravity force is less than fluid friction
3. Pressure force is equal but acts in opposite direction to the gravity force
4. Sum of fluid friction and pressure force is equal but opposite to gravity force

Question Number : 31 Question Id : 7621612071 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Pitot tube is used for measuring

Options :

1. pressure difference
2. flow rate
3. average velocity
4. local fluid velocity

Question Number : 32 Question Id : 7621612072 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Pascal's Law states that pressure at a point is equal in all directions

Options :

1. in a liquid at rest
2. in a fluid at rest
3. in laminar flow
4. in a turbulent flow

Question Number : 33 Question Id : 7621612073 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The capacity of a screen

Options :

1. has no relation with the screen aperture
2. is directly proportional to the screen aperture
3. is inversely proportional to the screen aperture
4. is directly proportional to the square of the screen aperture

Question Number : 34 Question Id : 7621612074 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A fluid energy mill is used for

Options :

1. cutting
2. grinding
3. ultragrinding

4. crushing

Question Number : 35 Question Id : 7621612075 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The function of a filter aid is to

Options :

1. increase the filtration rate
2. increase cake porosity
3. remove the plugs from the septum
4. decrease the filtration pressure

Question Number : 36 Question Id : 7621612076 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Separation of material of the same density based on their size by using their different rates of flow is called

Options :

1. sorting
2. sizing
3. flocculation
4. classification

Question Number : 37 Question Id : 7621612077 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Weber number is of significance in

Options :

1. liquid-liquid mixing
2. gas dispersion in liquid
3. liquid dispersion in liquid
4. solid suspension in liquid

Question Number : 38 Question Id : 7621612078 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Crushing efficiency is the ratio of

Options :

1. surface energy created by the crushing to the energy absorbed by the solid
2. the energy absorbed by the solid to that fed to the machine
3. the energy fed to the machine to the surface energy created by the crushing
4. the energy absorbed by the solid to the surface energy created by the crushing

Question Number : 39 Question Id : 7621612079 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A tube mill compared to a ball mill

Options :

1. has a higher length/ diameter ratio
2. produces a coarser product
3. has a higher diameter/ length ratio
4. uses much larger balls

Question Number : 40 Question Id : 7621612080 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The heat transfer by radiation takes place by means of

Options :

1. flow of fluid
2. electro-magnetic waves
3. molecular energy interchanges
4. flow of electrons

Question Number : 41 Question Id : 7621612081 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

As the difference between the wall temperature and bulk temperature increases, the boiling heat transfer coefficient

Options :

1. continues to increase
2. continues to decrease
3. goes through minimum
4. goes through maximum

Question Number : 42 Question Id : 7621612082 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Prandtl number is ratio of

Options :

1. mass diffusivity to thermal diffusivity
2. momentum diffusivity to thermal diffusivity
3. thermal diffusivity to mass diffusivity
4. thermal diffusivity to momentum diffusivity

Question Number : 43 Question Id : 7621612083 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Use of multiple effect evaporator results in

Options :

1. an increase in steam economy only
2. a decrease in steam economy only
3. an increase in evaporating capacity only
4. increase in both steam economy and evaporating capacity

Question Number : 44 Question Id : 7621612084 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Baffles are provided in heat exchangers to

Options :

1. increase pressure drop
2. decrease pressure drop
3. increase rate of heat transfer
4. decrease vibrations

Question Number : 45 Question Id : 7621612085 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The heat flux in the nucleate boiling regimes is proportional to

Options :

1. $(\Delta T)^2$
2. $(\Delta T)^4$
3. $(\Delta T)^3$
4. $\sqrt{\Delta T}$

Question Number : 46 Question Id : 7621612086 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Dietus- Boelter equation cannot be used for molten metals mainly due to its very low

Options :

1. Prandtl number
2. Grashof number
3. Thermal conductivity
4. Viscosity

Question Number : 47 Question Id : 7621612087 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A heat exchanger is required to cool 200 kgs of water per sec from 360°K to 340°K by means of 25 kg/sec of water entering at 300°K. Overall heat transfer coefficient is 2 kW/m² °K. Calculate the surface area required in a counter flow

Options :

1. 19.95 m²
2. 20.95 m²
3. 21.27 m²
4. 21.45 m²

Question Number : 48 Question Id : 7621612088 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

By increasing the feed rate to a fractionating column, separating a binary mixture at a fixed reflux ratio and separation, the required number of ideal stages

Options :

1. remains unaltered
2. decreases
3. increases
4. will increase and then decrease

Question Number : 49 Question Id : 7621612089 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A batch of material is dried under constant drying conditions. When drying is taking place from all the surface the rate of drying during the constant rate period is

Options :

1. directly proportional to the solid thickness
2. independent of the solid thickness
3. inversely proportional to the solid thickness
4. directly proportional to the square of the solid thickness

Question Number : 50 Question Id : 7621612090 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The reason for preferring packed towers over plate towers in distillation practice is that the packed tower operation gives

Options :

1. low pressure drop and high holdup
2. high pressure drop and low holdup
3. low pressure drop and low holdup

4. high pressure drop and high holdup

Question Number : 51 Question Id : 7621612091 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

At a given temperature, the humid volume is

Options :

1. linear function of humidity
2. inverse function of humidity
3. square function of humidity
4. no specific function of humidity

Question Number : 52 Question Id : 7621612092 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

For ternary system containing two pairs of partially miscible liquids, the number of plait point(s) is

Options :

1. one
2. two
3. three
4. zero

Question Number : 53 Question Id : 7621612093 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

According to the surface renewal theory the mass transfer coefficient is directly proportional to

Options :

1. D_{AB}
2. $D_{AB}^{1.5}$
3. $D_{AB}^{0.5}$
4. D_{AB}^2

Question Number : 54 Question Id : 7621612094 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

In a binary gas mixture, the diffusivity of A in B equals the diffusivity of B in A, when

Options :

1. A diffuses through B, but B does not diffuse through A
2. A and B diffuse by equi-molar counter pattern
3. the variations in concentration of A do not cause appreciable change in volumes of A and B in the mixture

4. the densities of A and B do not change during the diffusion

Question Number : 55 Question Id : 7621612095 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

In the enriching section of the continuous distillation column

Options :

1. more volatile component transfers from vapor to liquid
2. less volatile component transfers from liquid to vapor
3. more volatile component transfers from liquid to vapor
4. less volatile component transfers from vapor to liquid

Question Number : 56 Question Id : 7621612096 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

If minimum liquid rate is employed in a continuous counter current absorber, the driving force at the bottom of the absorber

Options :

1. is zero
2. is maximum
3. is minimum
4. cannot be decided

Question Number : 57 Question Id : 7621612097 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

At ambient temperature and pressure, gas phase diffusion coefficients are of the order of _____ m²/s.

Options :

1. 10⁵ to 10⁶
2. 10⁻⁵ to 10⁻⁶
3. 10⁻¹⁰ to 10⁻¹²
4. 10⁻¹⁵ to 10⁻¹⁸

Question Number : 58 Question Id : 7621612098 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Stanton Number (N_{st}) for mass transfer is defined as

Options :

1. $\frac{N_{Sh}}{N_{Re}}$
2. $\frac{N_{Sh}}{N_{Pe}}$
3. $N_{Sh} N_{Pe}$

4. $N_{Sh}(N_{Re} N_{Se})$

Question Number : 59 Question Id : 7621612099 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The Mass Transfer coefficient for a solid sphere of radius 'r', dissolving in a large volume of quiescent liquid, in which D is the diffusivity of the solute is

Options :

1. D/r
2. $D/2r$
3. proportional to \sqrt{D}
4. dependent on the Reynold's number

Question Number : 60 Question Id : 7621612100 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A distillation column with a reboiler is used for separation of a binary mixture. Number of theoretical stages, as determined by McCabe Thiele method are 16. If overall plate efficiency is 75%, what would be the number of actual plates required?

Options :

1. 20
2. 16
3. 22
4. 12

Question Number : 61 Question Id : 7621612101 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

If diffusivity value of $NH_3 - Air$ system at 1 atm and $35^\circ C$ is $2.15 \times 10^{-5} m^2/s$, what is the diffusivity value at 2 atm and $75^\circ C$?

Options :

1. $0.895 \times 10^{-5} m^2/sec$
2. $1.291 \times 10^{-5} m^2/sec$
3. $3.58 \times 10^{-5} m^2/sec$
4. $5.162 \times 10^{-5} m^2/sec$

Question Number : 62 Question Id : 7621612102 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A wet solid is to be dried from 80% to 10% moisture wet basis. The moisture to be removed per 1000 kg of the dried product is

Options :

1. 630 kg
2. 3888.9 kg

3. 700 kg
4. 3500 kg

Question Number : 63 Question Id : 7621612103 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

At total pressure of 725 mm Hg, the steam distillation temperature of aniline is 97°C. If the vapor pressure of H₂O is 648 mm Hg, what is the vapor pressure of aniline?

Options :

1. 77 mm Hg
2. 725 mm Hg
3. 648 mm Hg
4. zero

Question Number : 64 Question Id : 7621612104 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

If the percent humidity of air (30 °C, total pressure 100 kPa) is 24 % and the saturation pressure of water vapor at that temperature is 4 kPa, the percent relative humidity and the absolute humidity of air are

Options :

1. 25.2 and 0.0062 respectively
2. 24 and 0.0035 respectively
3. 20.7 and 0.0055 respectively
4. 18.2 and 0.00 respectively

Question Number : 65 Question Id : 7621612105 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

In a single stage extraction process, 10 kg of pure solvent S (containing no solute A) is mixed with 30 kg of feed F containing A at a mass fraction $X_F = 0.2$. The mixture splits into an extract phase E and a raffinate phase R, containing A at $Y_E = 0.5$ and $X_R = 0.05$ in mass fractions respectively. The total mass of the extract phase in kg is

Options :

1. 6.89
2. 8.89
3. 10
4. 8.25

Question Number : 66 Question Id : 7621612106 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A photo chemical reaction is

Options :

1. catalysed by light

2. initiated by light
3. accompanied with emission of light
4. used to convert heat energy into light

Question Number : 67 Question Id : 7621612107 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A reaction which proceeds with absorption of heat is termed as

Options :

1. exothermic reaction
2. endothermic reaction
3. thermo-chemical reaction
4. photochemical reaction

Question Number : 68 Question Id : 7621612108 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The excess energy of the reactants required to dissociate into product is known as

Options :

1. activation energy
2. binding energy
3. threshold energy
4. thermal energy

Question Number : 69 Question Id : 7621612109 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The rate at which a chemical substance reacts is proportional to its

Options :

1. equivalent weight
2. atomic weight
3. molecular weight
4. active mass

Question Number : 70 Question Id : 7621612110 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Which of the following is example of autocatalytic reaction?

Options :

1. Enzyme fermentation reaction
2. Microbial fermentation reaction
3. Photochemical reaction

4. Synthesis of ammonia

Question Number : 71 Question Id : 7621612111 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Every two minutes one reactor volume of feed is being treated at specified conditions in a continuous reactor. What is the space velocity (in min^{-1})?

Options :

1. 0.5
2. 2
3. 1
4. 4

Question Number : 72 Question Id : 7621612112 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Space time equals the mean residence time

Options :

1. when the density of the reaction mixture is constant
2. for large diameter tubular reactor
3. for narrow diameter tubular reactor
4. for CSTR

Question Number : 73 Question Id : 7621612113 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

In a semi- batch reactor

Options :

1. velocity of reaction can be controlled
2. maximum conversion can be controlled
3. both the reactants flow counter- currently
4. residence time is constant

Question Number : 74 Question Id : 7621612114 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Backmixing is most predominant in

Options :

1. a well stirred batch reactor
2. plug flow reactor
3. a single CSTR
4. CSTR connected in series

Question Number : 75 Question Id : 7621612115 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
3. remains constant
4. becomes infinite

Question Number : 76 Question Id : 7621612116 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

In an activated chemisorption process

Options :

1. activation energy is near to zero
2. chemisorption occurs slowly
3. chemisorption occurs in the initial stage of the reaction between gas and solid
4. chemisorption is independent of the temperature

Question Number : 77 Question Id : 7621612117 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Liquid A decomposes by irreversible first- order kinetics and the half- life period of this reaction is 12 min. The time required for 75% conversion of A is

Options :

1. 21 min.
2. 16 min.
3. 24 min.
4. 18 min.

Question Number : 78 Question Id : 7621612118 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A certain first- order reaction is half completed in 23 minutes. The rate constant for the reaction must be

Options :

1. 0.030 s^{-1}
2. 0.030 min^{-1}
3. 0.030 hr^{-1}
4. 0.10 min^{-1}

Question Number : 79 Question Id : 7621612119 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

For the isothermal gas- phase reaction $A \rightarrow 3B$, the fractional change in volume of the system between no conversion and complete conversion is

Options :

- 1
- 3
- 2
- $2/3$

Question Number : 80 Question Id : 7621612120 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Solenoid valve works like

Options :

- proportional controller
- on- off controller
- P- D controller
- P- I- D controller

Question Number : 81 Question Id : 7621612121 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

When a bare thermocouple is covered by protective sheath, the response becomes

Options :

- faster and oscillatory
- faster and non- oscillatory
- slower and oscillatory
- slower and non- oscillatory

Question Number : 82 Question Id : 7621612122 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Bode diagram is a graphical representation of

Options :

- logarithm of A.R. versus logarithm of frequency and phase angle versus logarithm of frequency
- A.R. versus logarithm of frequency and phase angle versus logarithm of frequency
- logarithm of A.R. versus frequency and phase angle versus frequency
- A.R. versus frequency and phase angle versus frequency

Question Number : 83 Question Id : 7621612123 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

For a first order system, the corner frequency (ω_c) is frequency corresponding to

Options :

1. $\omega T = 0$
2. $\omega T = 1$
3. $\omega T = \infty$
4. $\omega T = 1.414$

Question Number : 84 Question Id : 7621612124 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

For measuring the temperature of a furnace which is the most suitable instrument

Options :

1. thermocouple
2. optical pyrometer
3. bimetallic thermometer
4. resistance thermometer

Question Number : 85 Question Id : 7621612125 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Dilatometer is used to measure

Options :

1. stress
2. strain
3. deflection
4. contraction or expansion due to changes in temperature

Question Number : 86 Question Id : 7621612126 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

In the sustained cycling method of tuning, the control system is given a

Options :

1. step testing
2. impulse testing
3. sinusoidal testing
4. ramp testing

Question Number : 87 Question Id : 7621612127 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Bode diagrams are generated from output response of the system, subjected to which of the following inputs

Options :

1. impulse

2. step
3. ramp
4. sinusoidal

Question Number : 88 Question Id : 7621612128 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

In the case of a second-order system of under-damped case, the decay ratio and overshoot are related as

Options :

1. $overshoot = decay\ ratio^2$
2. $overshoot = \sqrt{decay\ ratio}$
3. $overshoot = decay\ ratio$
4. $overshoot = decay\ ratio \sqrt{decay\ ratio}$

Question Number : 89 Question Id : 7621612129 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

In the second-order system, the frequency at which the maximum amplitude ratio is obtained is given by the expression _____.

Options :

1. $\omega_r = \frac{\sqrt{1-\xi^2}}{\tau}$
2. $\omega_r = \frac{\sqrt{1-3\xi^2}}{\tau}$
3. $\omega_r = \frac{\sqrt{1-4\xi^2}}{\tau}$
4. $\omega_r = \frac{\sqrt{1-2\xi^2}}{\tau}$

Question Number : 90 Question Id : 7621612130 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A certain thermocouple has a specific time constant of 2s. If the process temperature changes abruptly from 800°C to 900°C, the temperature reading in an indicator of the thermocouple after 6s will be approximately

Options :

1. 863°C
2. 900°C
3. 890°C

4. 895°C

Question Number : 91 Question Id : 7621612131 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Baffles used on shell side of a heat exchanger will

Options :

1. decrease heat exchanger rate
2. increase heat transfer rate
3. decrease pressure drop on shell side
4. decrease pressure drop on tube side

Question Number : 92 Question Id : 7621612132 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Inside the distillation column

Options :

1. the pressure decreases gradually from bottom to top of the column
2. the highest temperature is at the top of the column
3. the pressure increases gradually from bottom to top of the column
4. the pressure remains constant throughout the column

Question Number : 93 Question Id : 7621612133 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Flooding velocity for regular packing

Options :

1. will be considerably greater than for random packing
2. will be considerably smaller than for random packing
3. will be equal to that for random packing
4. will be much smaller than for random packing

Question Number : 94 Question Id : 7621612134 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Foot valve is

Options :

1. a back-pressure valve
2. a relief valve
3. a direction control valve
4. a pressure reducing valve

Question Number : 95 Question Id : 7621612135 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Material for construction of the storage of HNO₃ is

Options :

1. Mild steel
2. Stainless steel
3. Brass
4. Nichrome

Question Number : 96 Question Id : 7621612136 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

15% Brine can be stored in

Options :

1. cast iron
2. monel
3. hastelloy
4. stainless steel

Question Number : 97 Question Id : 7621612137 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The thickness is least for which of the following pressure vessels ?

Options :

1. conical
2. elliptical
3. spherical
4. hemi-spherical

Question Number : 98 Question Id : 7621612138 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

'Total capital investment' for a chemical process plant comprises of the fixed capital investment and the

Options :

1. overhead costs
2. working capital
3. indirect production costs
4. direct production costs

Question Number : 99 Question Id : 7621612139 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Which of the following is a component of working capital investment?

Options :

1. process equipment
2. maintenance and repair

3. plant utilities
4. depreciation

Question Number : 100 Question Id : 7621612140 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The economic life of a small chemical plant is

Options :

1. usually more than a large chemical plant
2. usually much more than a large chemical plant
3. usually much less than a large chemical plant
4. always equal to a large chemical plant

Question Number : 101 Question Id : 7621612141 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The payback period for measurement of return on investment

Options :

1. does not measure the discounted rate of return
2. takes into account the cash inflows after the recovery of investment
3. gives a correct picture of profitability
4. under emphasizes liquidity

Question Number : 102 Question Id : 7621612142 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The declining- balance method is used when

Options :

1. the annual depreciation cost is a fixed percentage of the property value at the beginning of the particular year
2. the annual cost for depreciation is same each year
3. the value of the asset can decrease to zero at the end of the service life
4. the value of the asset decreases linearly with time

Question Number : 103 Question Id : 7621612143 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

If the interest rate i is expressed on the regular yearly basis and d represents the number of days in an interest period, the amount of exact simple interest is (P represents the Principal)

Options :

1. Pid
2. $\frac{Pid}{360}$

$$\frac{Pid}{365}$$

3. $\frac{id}{360}$

$$\frac{id}{360}$$

4. $\frac{id}{360}$

Question Number : 104 Question Id : 7621612144 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

For a nominal interest rate of 20% compounded continuously, the effective annual interest rate will be

Options :

1. equal to 20%
2. more than 20%
3. less than 20%
4. far less than 20%

Question Number : 105 Question Id : 7621612145 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A bond has a maturity value of Rs. 2420 and is paying discrete compound interest at an effective annual rate of 10 %. Determine the discount if the bond reaches maturity value in two years time

Options :

1. Rs. 242
2. Rs. 420
3. Rs. 2000
4. Rs. 508

Question Number : 106 Question Id : 7621612146 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Gypsum is

Options :

1. calcium chloride
2. potassium sulphate
3. sodium sulphate
4. calcium sulphate

Question Number : 107 Question Id : 7621612147 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Producer gas mainly consists of

Options :

1. CO, CO₂, N₂ and H₂
2. CO and H₂ only

3. H_2 and CH_4
4. C_2H_2 , CO_2 and H_2

Question Number : 108 Question Id : 7621612148 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Cement mainly contains

Options :

1. CaO , SiO_2 , Al_2O_3
2. MgO , SiO_2 , K_2O
3. Al_2O_3 , MgO , Fe_2O_3
4. CaO , MgO , K_2O

Question Number : 109 Question Id : 7621612149 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

In Monsanto 4-phase convertor, the percentage conversion of SO_2 to SO_3 is

Options :

1. about 70- 75%
2. about 75- 80%
3. about 92%
4. about 98%

Question Number : 110 Question Id : 7621612150 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Black liquor is converted into white liquor by

Options :

1. evaporation and burning the concentrate followed by causticisation of products
2. multi- effect evaporation only
3. selective liquid extraction
4. extractive distillation

Question Number : 111 Question Id : 7621612151 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Carborundum mainly consists of

Options :

1. bauxite
2. silicon carbide
3. boron carbide
4. calcium carbide

Question Number : 112 Question Id : 7621612152 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Fire clay is

Options :

1. a basic refractory
2. an acid refractory
3. a neutral refractory
4. not a refractory material

Question Number : 113 Question Id : 7621612153 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Kaoline is

Options :

1. refractory material
2. synthetic resin
3. artificial abrasive
4. blue pigment

Question Number : 114 Question Id : 7621612154 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

In an integrated steel plant, NH_3 present in coke oven gas is normally recovered as

Options :

1. $(\text{NH}_4)_2\text{SO}_4$
2. NH_4Cl
3. $(\text{NH}_4)_2\text{NO}_3$
4. Liquid NH_3

Question Number : 115 Question Id : 7621612155 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Washing soda is

Options :

1. Na_2CO_3
2. $\text{Na}_2\text{CO}_3 \cdot \text{H}_2\text{O}$
3. $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$
4. NaHCO_3

Question Number : 116 Question Id : 7621612156 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Oil is

Options :

1. a mixture of glycerides

2. a mixture of glycerides of fatty acids
3. solid at normal temperature
4. ester of alcohols other than glycerine

Question Number : 117 Question Id : 7621612157 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Rancidity of oil can be reduced by

Options :

1. decoloration
2. hydrogenation
3. oxidation
4. purification

Question Number : 118 Question Id : 7621612158 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Hydrazine (N_2H_4) is used mainly as

Options :

1. explosive
2. rocket fuel
3. an additive in detergents
4. as catalyst in hydrogenation of oil

Question Number : 119 Question Id : 7621612159 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Synthetic glycerine is produced from

Options :

1. toluene
2. phenol
3. propylene
4. naphthalene

Question Number : 120 Question Id : 7621612160 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Enamels

Options :

1. give good glossy finish
2. are same as varnish
3. are prepared from non- drying oil
4. do not contain pigment