tscte

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Chemical Engineering

Group Number :	1
Group Id :	39090031
Group Maximum Duration :	0
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Break time:	0
Group Marks:	120

Mathematics

Section Id :	39090057
Section Number :	1
Section type :	Online
Mandatory or Optional:	Mandatory
Number of Questions:	10
Number of Questions to be attempted:	10
Section Marks:	10
Display Number Panel:	Yes
Group All Questions:	No

Sub-Section Number:	1
Sub-Section Id:	39090057
Question Shuffling Allowed :	Yes

Question Number : 1 Question Id : 3909003601 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The value of k such that the system of equations has infinitely many solutions is

$$3x - y + z = 1$$
$$x + 2y + z = 0$$
$$5x + 3y + 3z = k$$

Options :

1. 1

2. 2

3. -1

4. 3

Question Number : 2 Question Id : 3909003602 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The product of Eigen values of $\begin{bmatrix} -1 & 2 & 2 \\ 4 & 5 & -6 \\ 2 & 9 & 0 \end{bmatrix}$ is

Options :

1. 0

2. 35

3. $\sqrt{35}$

4. 34

Question Number : 3 Question Id : 3909003603 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

$$\int_0^{\infty} \frac{\sin^2 x}{x^2}\, dx =$$

Options :

1. $\pi/2$

2. $\pi/4$

3. $\pi/5$

4. $\pi/6$

Question Number : 4 Question Id : 3909003604 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

$\text{div}(x^2 + y^4, x^2 - y^4) =$

Options :

1. $y - 2x^2$

2. $2(y - 2x^2)$

3. $x - 2y^2$

4. $2(x - 2y^2)$

Question Number : 5 Question Id : 3909003605 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Perpendicular distance from (0,0,0) to the line $x = r - 1,\ y = r + 1,\ z = 2r$ is

Options :

1. 1

2. $\sqrt{2}$

3. $\sqrt{3}$

4. 4

Question Number : 6 Question Id : 3909003606 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The solution of $(x + y)dy = dx$ such that $x = 1$, when $y = 0$, is $x + y + 1 = ke^y$, where $k =$

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 7 Question Id : 3909003607 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

$$\frac{1}{D^4+1}(\sin x) =$$

Options :

1. $\frac{1}{2}\cos x$

2. $\frac{1}{4}\cos x$

3. $\frac{1}{4}\sin x$

4. $\frac{1}{2}\sin x$

Question Number : 8 Question Id : 3909003608 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

$$\frac{1}{2\pi i}\oint_{|z|=1} z^3 e^{z^{-2}} dz =$$

Options :

1. 1

2. 1/2

3. 1/3

4. 1/4

Question Number : 9 Question Id : 3909003609 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If $f(z) = \frac{z^3}{\sin^2 z}$, then $z = 0$ is an isolated singularity which is

Options :

1. removable

2. a pole

3. essential

4. a pole of order 2

Question Number : 10 Question Id : 3909003610 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If Δ is the forward difference operator, then $\log\left(1+\frac{\Delta f(x)}{f(x)}\right)=$

Options :

1. $\Delta \log^2 f(x)$

2. $\Delta \log f(x)$

3. $\Delta \log \sqrt{f(x)}$

4. $\Delta f(x)$

Chemical Engineering

Section Id :	39090058
Section Number :	2
Section type :	Online
Mandatory or Optional:	Mandatory
Number of Questions:	110
Number of Questions to be attempted:	110
Section Marks:	110
Display Number Panel:	Yes
Group All Questions:	No

Sub-Section Number:	1
Sub-Section Id:	39090058
Question Shuffling Allowed :	Yes

Question Number : 11 Question Id : 3909003611 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Contact process for sulphuric acid manufacture

Options :

1. yields acid of higher concentration than chamber process.

2. yields acid of lower concentration than chamber process.

3. is obsolete.

4. eliminates absorber.

Question Number : 12 Question Id : 3909003612 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Polyvinyl chloride is a _____material

Options :

1. Thermosetting

2. Thermoplastic

3. Fibrous

4. chemically active

Question Number : 13 Question Id : 3909003613 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Fats as compared to oils have

Options :

1. More unsaturated glycerides of fatty acids

2. Less unsaturated glycerides of fatty acids

3. Much higher reactivity to oxygen

4. Lower melting point

Question Number : 14 Question Id : 3909003614 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Nylon-6 is manufactured from

Options :

1. caprolactum.

2. adipic acid and hexamethylene diamine.

3. maleic anhydride and hexamethylene diamine.

4. sebasic acid and hexamethylene diamine.

Question Number : 15 Question Id : 3909003615 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Synthesis gas is a mixture of

Options :

1. CO and H_2

2. N_2 and H_2

3. N_2, CH_4 and CO

4. CO_2 and H_2

Question Number : 16 Question Id : 3909003616 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following statements is correct?

Options :

1. Visbreaking and Coking processes employ 'cracking' in oil refinery

2. Coking and Pyrolysis processes employ 'cracking' in oil refinery

3. Pyrolysis and Visbreaking processes employ 'cracking' in oil refinery

4. Neither Pyrolysis nor Visbreaking processes employ 'cracking' in oil refinery

Question Number : 17 Question Id : 3909003617 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following is (are) natural insulating material(s)?

Options :

1. Diatomaceous earth/kieselgur

2. Asbestos

3. Vermiculite

4. Diatomaceous earth/kieselgur, Asbestos & Vermiculite

Question Number : 18 Question Id : 3909003618 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

20% oleum means that in 100kg oleum, there are 20 kg of

Options :

1. SO_3 and 80 kg of H_2SO_4

2. H_2SO_4 and 80 kg of SO_3

3. SO_3 for each 100 kg of H_2SO_4

4. H_2SO_4 and 100 kg of SO_3

Question Number : 19 Question Id : 3909003619 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Double contact double absorption process is the most recent process for the manufacture of

Options :

1. Nitric acid

2. sulphuric acid

3. ammonium sulfate

4. hydrochloric acid

Question Number : 20 Question Id : 3909003620 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

NPK means a _____ fertilizer.

Options :

1. Mixed

2. Potassic

3. liquid

4. solid

Question Number : 21 Question Id : 3909003621 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Oxygen content of the flue gases on wet basis is determined by

Options :

1. Orsat analyzer

2. Fyrite analyzer

3. Zirconium oxide cell

4. Orsat analyzer, Fyrite analyzer & Zirconium oxide cell

Question Number : 22 Question Id : 3909003622 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The weight fraction of methanol in an aqueous solution is 0.64. The mole fraction of methanol X_M satisfies

Options :

1. $X_M < 0.5$

2. $X_M = 0.5$

3. $0.5 < X_M < 0.64$

4. $X_M \geq 0.64$

Question Number : 23 Question Id : 3909003623 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

At a given temperature and pressure, a liquid mixture of benzene and toluene is in equilibrium with its vapour. The available degree(s) of freedom is (are)

Options :

1. Zero

2. 1

3. 2

4. 3

Question Number : 24 Question Id : 3909003624 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The volume occupied by 1kmole of an ideal gas at 273.15 K and 101.325 KPa is

Options :

1. $22.414m^3$

2. $359m^3$

3. $22414m^3$

4. $35.9m^3$

Question Number : 25 Question Id : 3909003625 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

CO Pure A in gas phase enters a reactor, 50% of this A is converted to B through the reaction A→3B. Mole fraction of A in the exit stream is

Options :

1. 1/2

2. 1/3

3. 1/4

4. 1/5

Question Number : 26 Question Id : 3909003626 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Methane is mixed with stoichiometric proportion of O_2 and completely combusted. The no. of additional specifications required to determine the product flow rate and composition is

Options :

1. Zero

2. 1

3. 2

4. 3

Question Number : 27 Question Id : 3909003627 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Complete combustion of 8kg of methane produces _____kg of CO_2

Options :

1. 16

2. 22

3. 44

4. 56

Question Number : 28 Question Id : 3909003628 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Amount of CO_2 produced by 1 kg of carbon on complete combustion is _____kg

Options :

1. 3/11

2. 3/8

3. 8/3

4. 11/3

Question Number : 29 Question Id : 3909003629 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Unsaturated air (with dry and wet bulb temperatures being 35°C and 25°C respectively) is passed through water spray chamber maintained at 35°C. The air will be

Options :

1. cooled only

2. humidified only

3. Cooled and humidified

4. dehumidified

Question Number : 30 Question Id : 3909003630 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

1 kg of a saturated aqueous solution of a highly soluble component A at 60°C is cooled to 25°C. The solubility limits of A are (0.6 kgA/kg water) at 60°C and (0.2 kgA/kg water) at 25°C. The amount in kg of the crystals formed is

Options :

1. 0.4

2. 0.25

3. 0.2

4. 0.175

Question Number : 31 Question Id : 3909003631 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For absorbing a sparingly soluble gas in a liquid, the

Options :

1. gas side co-efficient should be increased

2. liquid side coefficient should be increased

3. gas side co-efficient should be decreased.

4. liquid side co-efficient should be decreased.

Question Number : 32 Question Id : 3909003632 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A natural draft cooling tower is filled with wooden grids, which covers about _____ percent of the tower height.

Options :

1. 10-15

2. 30-40

3. 70-80

4. 90-100

Question Number : 33 Question Id : 3909003633 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The boiling points of pure components of a binary system _____ with increase in total pressure of the system.

Options :

1. decreases

2. increases

3. remains unchanged

4. first decreases and then remain constant

Question Number : 34 Question Id : 3909003634 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The operating cost of a distillation column at minimum reflux ratio is

Options :

1. Minimum

2. Maximum

3. Infinite

4. zero

Question Number : 35 Question Id : 3909003635 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The reflux to a distillation column is 100 moles/hr, when the overhead product rate is 50 moles/hr. The reflux ratio is

Options :

1. 2

2. 0.5

3. 50

4. 150

Question Number : 36 Question Id : 3909003636 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The wet and dry bulb temperatures for a vapour-gas mixture are 25°C and 30°C respectively. If the mixture is heated to 45°C at constant pressure, the wet bulb temperature will be _____.

Options :

1. equal to 25°C

2. greater than 25°C

3. between 0°C and 25°C

4. equal to - 25°C

Question Number : 37 Question Id : 3909003637 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Henry's law states that the

Options :

1. partial pressure of a component over a solution is proportional to its mole fraction in the liquid

2. partial pressure of a component over a solution is proportional to the mole fraction in the vapour

3. vapour pressure is equal to the product of the mole fraction and total pressure

4. partial pressure is equal to the product of the mole fraction and total pressure

Question Number : 38 Question Id : 3909003638 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Steady state equimolal counter diffusion is encountered in

Options :

1. separation of a binary mixture by distillation

2. absorption of NH_3 from air by water

3. all liquid-liquid diffusion systems

4. all liquid-solid diffusion systems

Question Number : 39 Question Id : 3909003639 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Cox chart, which is useful in the design of distillation column particularly for petroleum hydrocarbons, is a plot of (where, P = vapor pressure, T = temperature)

Options :

1. log P vs. T

2. log P vs. log T

3. T vs. P

4. P vs. log T

Question Number : 40 Question Id : 3909003640 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In a gas-liquid absorption column, for obtaining the maximum absorption efficiency

Options :

1. liquid stream should be distributed uniformly

2. gas stream should be distributed uniformly

3. both gas as well as liquid streams should be distributed uniformly

4. bypassing should be completely avoided

Question Number : 41 Question Id : 3909003641 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A pure drug is administered as a sphere and as a cube. The amount of drug is the same in the two tablets. Assuming that the shape and size do not influence the mass transfer, the ratio of rate of dissolution in water at $t = 0$ for the cubic to spherical tablet is

Options :

1. 0.54

2. 1.04

3. 1.24

4. 1.94

Question Number : 42 Question Id : 3909003642 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If x_D = overhead product molal composition and R_D = reflux ratio, then slope and intercept of the operating line for rectifying section are respectively

Options :

1. $\frac{x_D}{R_D+1}, \frac{R_D}{R_D+1}$

2. $\frac{R_D}{R_D+1}, \frac{x_D}{x_D+1}$

3. $\frac{x_D}{R_D+1}, \frac{R_D+1}{R_D}$

4. $\frac{R_D+1}{R_D}, \frac{x_D}{R_D+1}$

Question Number : 43 Question Id : 3909003643 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

An ideal fluid is one which

Options :

1. is very viscous

2. is frictionless and incompressible

3. has negligible surface tension

4. obeys Newton's law of viscosity

Question Number : 44 Question Id : 3909003644 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For a fluidised bed, with the increase in expansion of the bed, upto solids carry over from the bed, the pressure drop across the bed

Options :

1. Increases rapidly

2. Decreases rapidly

3. First increases then decreases

4. Remains essentially constant

Question Number : 45 Question Id : 3909003645 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Stoke's equation is valid in the Reynolds number range

Options :

1. 0.01 to 0.1

2. 0.1 to 2

3. 2 to 10

4. 10 to 100

Question Number : 46 Question Id : 3909003646 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In centrifugal pumps, cavitation occurs, when pressure of the impeller eye or vane becomes

Options :

1. Less than atmospheric pressure

2. More than liquid vapor pressure

3. Less than liquid vapor pressure

4. More than atmospheric pressure

Question Number : 47 Question Id : 3909003647 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Bernoulli's equation for steady frictionless flow states that, along a streamline

Options :

1. Total pressure is constant

2. Total mechanical energy is constant

3. Velocity head is constant

4. Total pressure and velocity head are constant

Question Number : 48 Question Id : 3909003648 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For laminar flow of a fluid through a packed bed of spheres of diameter d, the pressure drop per unit length of bed depends upon the sphere diameter as

Options :

1. d

2. d^2

3. d^4

4. $1/d^2$

Question Number : 49 Question Id : 3909003649 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A 1 m high bed made up of 2 mm particles is to be fluidised by an oil (density 900 kg/m^3; velocity 0.01 Pa.s). If at the point of incipient fluidisation, the bed voidage is 39% and the pressure drop across the bed is 10 kPa, then the density of particles is

Options :

1. 2571 kg/m^3

2. 3514 kg/m^3

3. 4000 kg/m^3

4. 4350 kg/m^3

Question Number : 50 Question Id : 3909003650 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Bed pressure drop in an air fluidised bed of catalyst particles ($\rho p = 2000\ kg/m^3$, Dp = 0.05 cm) of 60 cm bed depth and bed porosity of 0.5, expressed in cm of water (manometer is)

Options :

1. 90

2. 60

3. 45

4. 30

Question Number : 51 Question Id : 3909003651 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Consider a duct of square cross section of side 'b'. The hydraulic radius is given by

Options :

1. b/8

2. b/4

3. b/2

4. b

Question Number : 52 Question Id : 3909003652 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For the turbulent flow through a smooth pipe, the following correlation for the friction factor is valid: $f = cRe^{-0.2}$; where c is a constant. Suppose that the velocity is increased by 100% the pressure drop:

Options :

1. Increases by less than 100%

2. Decreases by less than 100%

3. Increases by more than 100%

4. Decreases by more than 100%

Question Number : 53 Question Id : 3909003653 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A Bingham fluid of viscosity μ=10 Pa.s, and yield stress τ_0=10 kPa, is sheared between flat parallel plates separated by a distance 10^{-3} m. The top plate is moving with a velocity of 1 m/s. The shear stress on the plate is

Options :

1. 10 kPa

2. 20 kPa

3. 30 kPa

4. 40 kPa

Question Number : 54 Question Id : 3909003654 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For laminar flow of a shear-thinning liquid in a pipe, if the volumetric flow rate is doubled, the pressure gradient, will increase by a factor of

Options :

1. 2

2. <2

3. >2

4. 1/2

Question Number : 55 Question Id : 3909003655 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A 0.5 m high bed made up of a 1 mm diameter glass spheres (density 2500 kg/m^3) is to be fluidised by water (density 1000 kg/m^3). If at the point of incipient fluidisation, the bed voidage is 40%, the pressure drop across the bed is

Options :

1. 4.4 kPa

2. 2.94 kPa

3. 3.7 kPa

4. 2.4 kPa

Question Number : 56 Question Id : 3909003656 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In fluidisation using a perfect spherical particles the operating range of fluidisation velocity is

Options :

1. Independent of particle size

2. Greater for bigger particle size

3. Greater for smaller particle size

4. Proportional to the square of particle size

Question Number : 57 Question Id : 3909003657 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The sphericity of a cylinder of 1 cm diameter and length 3 cm is

Options :

1. 0.9

2. 0.78

3. 0.6

4. 0.5

Question Number : 58 Question Id : 3909003658 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The energy required per unit mass to grind limestone particles of very large size to 100 μm is 12.7 kWh/ton. An estimate (using Bond's Law) of the energy to grind the particles from a very large size to 50 μm is

Options :

1. 6.35 kWh/ton

2. 9.0 kWh/ton

3. 18 kWh/ton

4. 25.4 kWh/ton

Question Number : 59 Question Id : 3909003659 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The angle formed by pouring a powder as a heap on a flat surface is known as:

Options :

1. Contact angle

2. Angle of nip

3. Angle of repose

4. Critical angle

Question Number : 60 Question Id : 3909003660 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For a sphere falling in a constant drag coefficient regime, its terminal velocity depends on its diameter d as

Options :

1. d

2. $d^{0.5}$

3. d^2

4. 1/d

Question Number : 61 Question Id : 3909003661 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A particle A of diameter 10 microns settles in an oil of specific gravity 0.9 and viscosity 10 poise under Stokes law. A particle B with diameter 20 microns settling in the same oil will have a settling velocity

Options :

1. Same as that of A

2. One-fourth as that of A

3. Twice as that of A

4. Four-times as that of A

Question Number : 62 Question Id : 3909003662 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following uses impact and attrition?

Options :

1. Ball mill

2. Tumbling mill

3. Ultra-fine grinders

4. Hammer mill

Question Number : 63 Question Id : 3909003663 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

According to Rittinger's law, work required is proportional to _____

Options :

1. Energy Consumed

2. Surface area created

3. Final Volume

4. Initial feed

Question Number : 64 Question Id : 3909003664 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In the below equation, when n = 1 it yields?

$$d\left(\frac{P}{m}\right) = \frac{-KdD_s}{D_s^n}$$

Options :

1. Kick's law

2. Bond's law

3. Rittinger's law

4. Bose equation

Question Number : 65 Question Id : 3909003665 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

At very low r.p.m (Re less than 5), the power required for agitation is proportional to

Options :

1. D

2. D^2

3. D^3

4. D^5

Question Number : 66 Question Id : 3909003666 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The power number for a stirred tank becomes constant at high Reynolds number. In this limit, the variation of power input with impeller rotational speed (N) is proportional to

Options :

1. N^{-1}

2. N^{1}

3. N^{2}

4. N^{3}

Question Number : 67 Question Id : 3909003667 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A suspension of uniform particles in water at a concentration of 500 kg of solids per cubic meter of slurry is settling in a tank. Density of the particles is 2500 kg/m^3 and terminal velocity of a single particle is 20 cm/s. What will be the settling velocity of suspension? Richardson-Zaki index is 4.6

Options :

1. 20 cm/s

2. 14.3 cm/s

3. 7.16 cm/s

4. 3.58 cm/s

Question Number : 68 Question Id : 3909003668 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In pipe flow, heat is transferred from hot wall to the liquid by

Options :

1. Forced convection only

2. Conduction only

3. Forced convection and conduction

4. Free and forced energy

Question Number : 69 Question Id : 3909003669 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

To determine the heat transfer coefficient Dittus-Boelter equation is valid for:

Options :

1. Laminar flow

2. Turbulent flow

3. For liquid metals

4. Natural convection

Question Number : 70 Question Id : 3909003670 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Ratio of effectiveness of fin to efficiency of fin is
(where P = perimeter; I = length; A = cross sectional area of fin)

Options :

1. $\frac{PI}{A}$

2. $\sqrt{\frac{PI}{A}}$

3. $\frac{A}{PI}$

4. $\sqrt{\frac{A}{PI}}$

Question Number : 71 Question Id : 3909003671 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Fraction of radiative energy leaving one surface that strikes the other surface is called

Options :

1. Radiative flux

2. Emissive power of the first surface

3. View factor

4. Re-radiation flux

Question Number : 72 Question Id : 3909003672 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For the radiation between two infinite parallel planes of emissivity ε_1 and ε_2 respectively, which one of the following is the expression for emissivity factor?

Options :

1. $\varepsilon_1\varepsilon_2$

2. $\frac{1}{\varepsilon 1}+\frac{1}{\varepsilon 2}$

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

4. $\frac{1}{\frac{1}{\varepsilon 1}+\frac{1}{\varepsilon 2}-1}$

Question Number : 73 Question Id : 3909003673 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Critical thickness of insulation for sphere is given by

Options :

1. $\frac{2h}{k}$

2. $\frac{h}{k}$

3. $\frac{2k}{h}$

4. $\frac{k}{2h}$

Question Number : 74 Question Id : 3909003674 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Unsteady state heat conduction occurs when

Options :

1. Temperature distribution is independent of time

2. Temperature distribution is dependent on time

3. Heat flows in one direction only

4. Three-dimensional heat flow is concerned

Question Number : 75 Question Id : 3909003675 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Natural convection is characterized by

Options :

1. Grashof number

2. Peclet number

3. Reynold number

4. Prandtl number

Question Number : 76 Question Id : 3909003676 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In sub-cooled boiling

Options :

1. The temperature of the heating surface is less than the boiling point of the liquid

2. The temperature of the heating surface is more than the boiling point of the liquid

3. Bubbles from heating surface are absorbed by the mass of the liquid

4. Very large vapour space is necessary

Question Number : 77 Question Id : 3909003677 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Heat flux increases with temperature drop beyond the Leiden frost point in the plot of Heat flux Vs. Temperature drops for a boiling liquid because

Options :

1. Convection becomes important

2. Conduction becomes important

3. Radiation becomes important

4. Sub cooled boiling occurs

Question Number : 78 Question Id : 3909003678 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In condensation, relation between heat transfer coefficients, 'h_d' drop-wise condensation and film-wise condensation 'h_f' is

Options :

1. $h_d > h_f$

2. $h_d < h_f$

3. $h_d = h_f$

4. $h_d << h_f$

Question Number : 79 Question Id : 3909003679 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If a single tube pass heat exchanger is converted to two pass, then for the same flow rate the pressure drop per unit length in tube side will

Options :

1. Increase by 1.8 times

2. Decrease by 2^2

3. Increase by $2^{1.6}$

4. Remain unchanged

Question Number : 80 Question Id : 3909003680 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The Nusselt number for fully developed (both thermally and hydro dynamically) laminar flow through a circular pipe whose surface temperature remains constant is

Options :

1. 1.66

2. 88.66

3. 3.66

4. Depend on N_{Re} only

Question Number : 81 Question Id : 3909003681 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For an ideal plug flow reactor, the value of the pikelet number is

Options :

1. 0

2. ∞

3. 1

4. 10

Question Number : 82 Question Id : 3909003682 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The extent of reaction is

Options :

1. Different for reactants & products

2. Dimensionless

3. Depend on the stoichiometric coefficients

4. Independent of the stoichiometric coefficients

Question Number : 83 Question Id : 3909003683 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

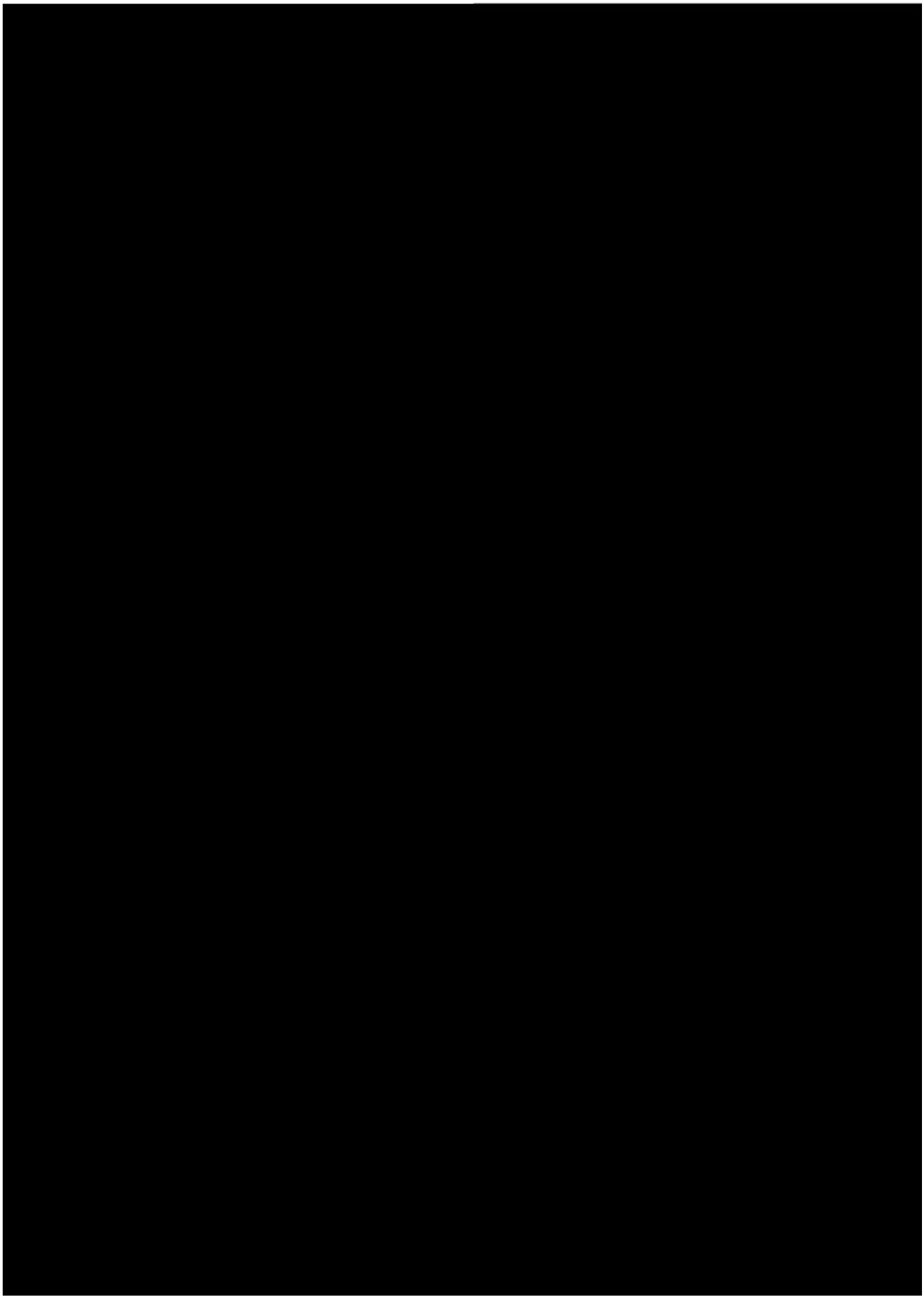
From collision theory, the reaction rate constant is proportional to

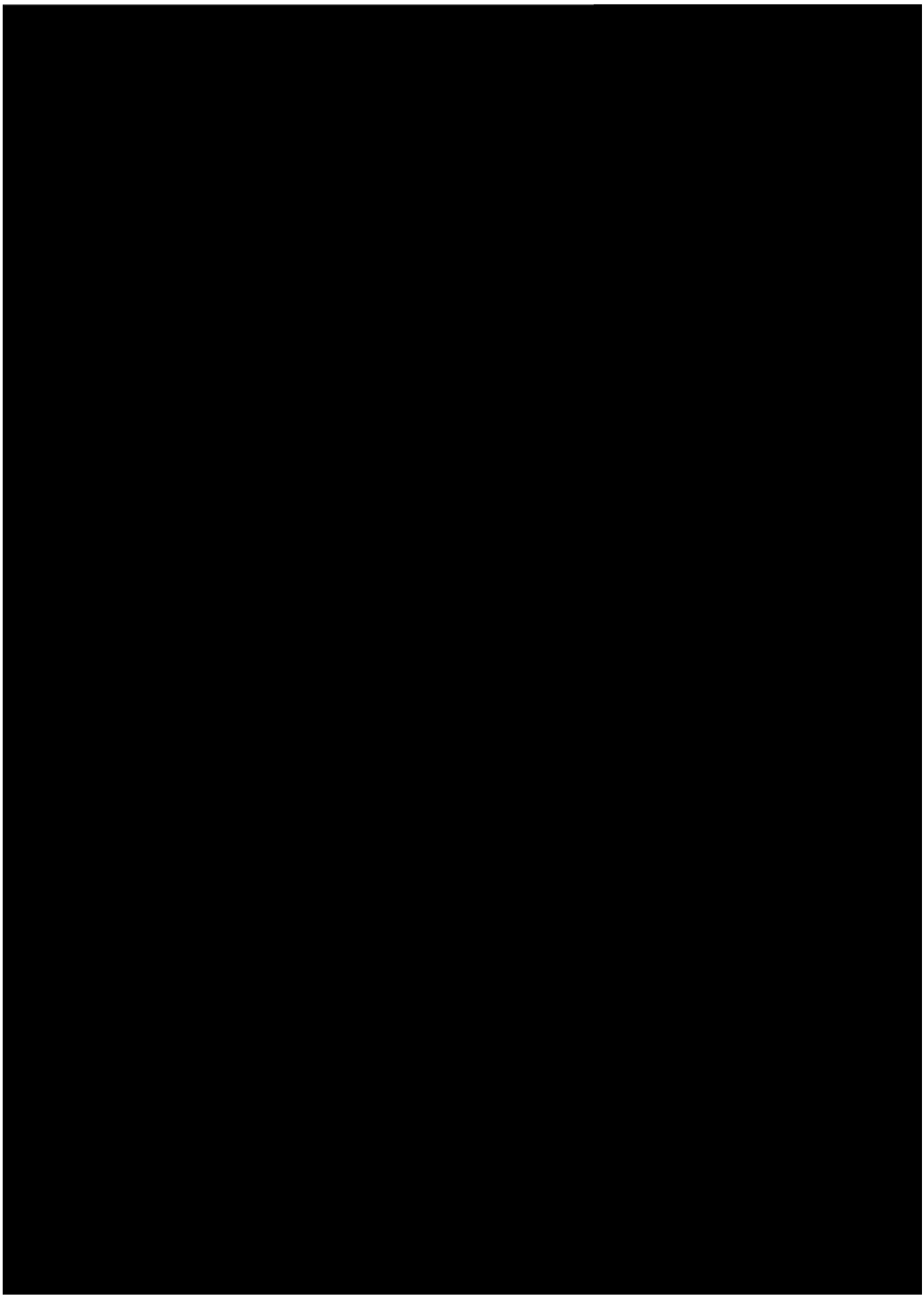
Options :

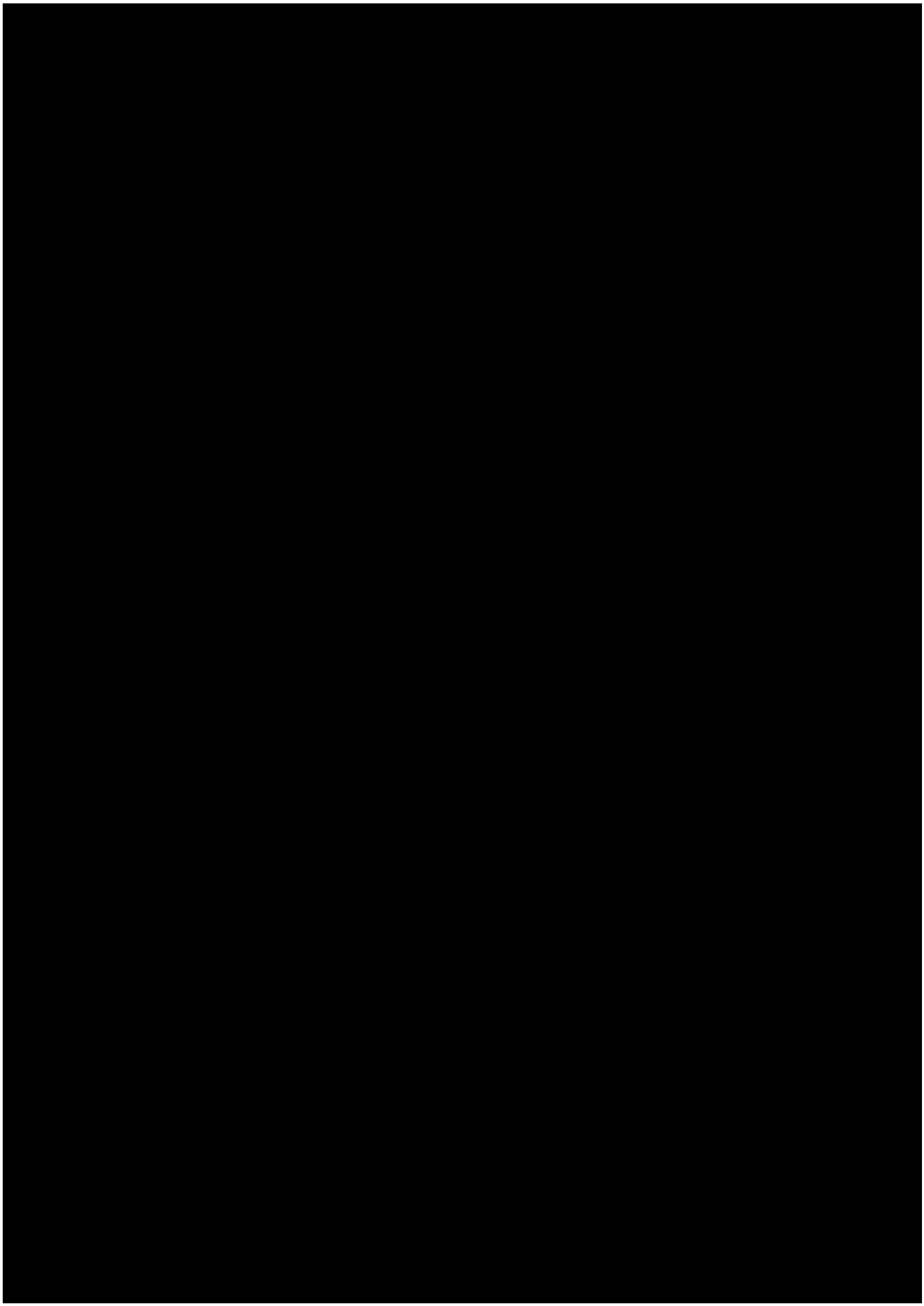
1. $R^{-\frac{E}{RT}}$

2. $e^{-\frac{E}{2RT}}$









1. 15, 10, 5

2. 5, 10, 15

3. 10, 5, 15

4. 10, 15, 5

Question Number : 94 Question Id : 3909003694 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A negative gain margin expressed in decibels means a/an _____ system.

Options :

1. absolutely stable

2. unstable

3. critically damped

4. marginally stable

Question Number : 95 Question Id : 3909003695 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A single tank system, the transfer function of level to inlet flow rate is

Options :

1. R/TS

2. R/ (TS + 1)

3. 1/ (TS + 1)

4. 1/TS

Question Number : 96 Question Id : 3909003696 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Time constant for liquid level tank is

Options :

1. R/A

2. RA

3. R^2/A

4. R^2A

Question Number : 97 Question Id : 3909003697 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Transfer function of transportation lag is

Options :

1. e^{TS}

2. e^{-TS}

3. $1/(TS+1)$

4. $1/(TS-1)$

Question Number : 98 Question Id : 3909003698 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following controllers has the least maximum deviation?

Options :

1. P-controller

2. P-I controller

3. P-I-D controller

4. P-D controller

Question Number : 99 Question Id : 3909003699 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

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

Options :

1. Kc is reduced.

2. Kc is increased.

3. integral control action is introduced.

4. derivative control action is introduced.

Question Number : 100 Question Id : 3909003700 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For an input forcing function, $X(t) = 2t^2$, the Laplace transform of this function is

Options :

1. $2/s^2$

2. $4/s^2$

3. $2/s^3$

4. $4/s^3$

Question Number : 101 Question Id : 3909003701 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

What is amplitude ratio?

Options :

1. ratio of output to input amplitude

2. ratio of input to output amplitude

3. ratio of log of output amplitude to input amplitude

4. ratio of log of input amplitude to output amplitude

Question Number : 102 Question Id : 3909003702 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Linearization of nonlinear system is done by

Options :

1. universal series

2. Laplace transformation

3. Newton's law

4. Taylor series

Question Number : 103 Question Id : 3909003703 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The second order system with the transfer function $\frac{4}{s^2+2s+4}$ has a damping ratio of

Options :

1. 2.0

2. 0.5

3. 1.0

4. 4.0

Question Number : 104 Question Id : 3909003704 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

When the damping co-efficient (ξ) is unity, the system is

Options :

1. Overdamped.

2. Critically damped.

3. Underdamped.

4. Highly fluctuating.

Question Number : 105 Question Id : 3909003705 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Cascade control means

Options :

1. feed forward control.

2. more than one feed-back loop.

3. on-off control.

4. one feed-back loop.

Question Number : 106 Question Id : 3909003706 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

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 : 107 Question Id : 3909003707 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Fresh water carrying pipelines in chemical industries are coloured with _____ Colour.

Options :

1. sea green

2. brown

3. yellow

4. red

Question Number : 108 Question Id : 3909003708 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The ratio of shear stress to shear strain is called

Options :

1. bulk modulus

2. shear modulus

3. modulus of rigidity

4. modulus of elasticity

Question Number : 109 Question Id : 3909003709 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

25 per cent cut segmental baffle means that the baffle

Options :

1. height is 75% of the I.D. of the shell.

2. height is 25% of the I.D. of the shell.

3. spacing is 75% of its height.

4. width is 25% of its height.

Question Number : 110 Question Id : 3909003710 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In a shell and tube heat exchanger, the 'tube pitch' is defined as the

Options :

1. outer diameter of the tube for square pitch.

2. shortest distance between two adjacent tube holes.

3. shortest centre-to-centre distance between adjacent tubes.

4. longest centre-to-centre distance between adjacent tubes.

Question Number : 111 Question Id : 3909003711 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Declining balance method cannot be used when

Options :

1. scrap value (Vs) > 1

2. scrap value (Vs) = 1

3. scrap value (Vs) = 0

4. for all the scarp values

Question Number : 112 Question Id : 3909003712 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The ratio of gross annual sales to the fixed capital investment is termed as the _____ ratio.

Options :

1. cash reserve

2. capital

3. turnover

4. investment

Question Number : 113 Question Id : 3909003713 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A present sum of Rs. 100 at the end of one year, with half-yearly rate of interest at 10%, will be Rs.

Options :

1. 121

2. 110

3. 97

4. 91

Question Number : 114 Question Id : 3909003714 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Vertical storage vessels are never supported by _____ support.

Options :

1. bracket

2. saddle

3. skirt

4. lug

Question Number : 115 Question Id : 3909003715 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

When one of the fluids is highly corrosive and has fouling tendency, it should

Options :

1. preferably flow inside the tube for its easier internal cleaning.

[redacted]

2. preferably flow outside the tube.

3. flow at a very slow velocity.

