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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 :	CH2
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Chemical Engineering

Group Number :	1
Group Id :	83189666
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Show Attended Group? :	No
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Chemical Engineering

Section Id :	83189666
Section Number :	1
Section type :	Online
Mandatory or Optional :	Mandatory
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Sub-Section Number :	1
Sub-Section Id :	83189666
Question Shuffling Allowed :	Yes

Question Number : 1 Question Id : 8318967801 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

The absolute humidity of air at 101.325 kPa is measured to be 0.02 kg of water per kg of dry air. Then the partial pressure of water vapour in the air is:

Options :

1. ✖ 1.99 kPa

2. ✖ 2.55 kPa

3. ✖ 3.16 kPa

4. ✔ 3.87 kPa

Question Number : 2 Question Id : 8318967802 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

The minimum amount of work required to operate a refrigerator which removes 1000 Cal heat at 0°C and rejects at 50°C will be:

Options :

1. ✖ 170 Cal

2. ✖ 120 Cal

3. ✖ 150 Cal

4. ✔ 183.15 Cal

Question Number : 3 Question Id : 8318967803 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

The entropy of single crystalline Silicon at absolute zero will be:

Options :

1. ✖ 2

2. ✖ 1

3. ✔ 0

4. ✖ 10

Question Number : 4 Question Id : 8318967804 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

Which statement about entropy is incorrect?

Options :

1. ✖ Entropy is zero at 0 K (Third Law)

2. ✔ Entropy decreases in spontaneous adiabatic processes

3. ✖ Entropy production is irreversible

4. ✖ Entropy measures energy dispersal

Question Number : 5 Question Id : 8318967805 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

If the vapour pressure at two temperatures of a solid phase in equilibrium with its liquid phase is known, then the latent heat of fusion can be calculated by the:

Options :

1. ✖ Nernst Heat Theorem

2. ✖ Maxwell's equation

3. ✖ Van Laar equation

4. ✔ Clayperon-Claussius equation

Question Number : 6 Question Id : 8318967806 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

The theoretical minimum work required to separate one mole of a liquid mixture at 1 atm, containing 50 mole % each of n-heptane and n-octane into pure compounds, each at 1 atm, is:

Options :

1. ✖ $-2\,RT \ln 0.5$

2. ✖ $2\,RT$

3. ✔ $-RT \ln 0.5$

4. ✖ $0.5\,RT$

Question Number : 7 Question Id : 8318967807 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

Design an approach to estimate the activity coefficient of a component in a non-ideal liquid mixture:

Options :

1. ✖ Use the ideal gas law

Apply the Gibbs-Duhem equation with experimental data

2. ✔

Assume it equals mole fraction

3. ✖

Use the Second Law only

4. ✖

Question Number : 8 Question Id : 8318967808 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

Which of the following equation must be perfunctorily satisfied while dealing with fluid flow problems?

Options :

Newton's third law

1. ✖

Law of conservation of momentum

2. ✖

Continuity equation

3. ✔

Newton's second law

4. ✖

Question Number : 9 Question Id : 8318967809 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

1 mole of Argon gas is heated at constant pressure from 200K to 600K, If $C_p = 4$ Cal.deg^{-1}mol^{-1}, then the change in entropy will be: (Given ln 3 = 1.09)

Options :

4.36 Cal.deg^{-1}.mol^{-1}

1. ✔

2.76 Cal.deg^{-1}.mol^{-1}

2. ✖

3.34 Cal.deg^{-1}.mol^{-1}

3. ✖

5.39 Cal.deg^{-1}.mol^{-1}

4. ✖

Question Number : 10 Question Id : 8318967810 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

The change in enthalpy of a system is related to the heat absorbed at a:

Options :

1. ✖ Constant volume

2. ✖ Constant temperature

3. ✖ Constant mole fraction

4. ✔ Constant pressure

Question Number : 11 Question Id : 8318967811 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

If a combustion, 4kg of organic compound gives 11kg of CO_2, the percentage of carbon in the compound will be_____

Options :

1. ✖ 50

2. ✔ 75

3. ✖ 25

4. ✖ 60

Question Number : 12 Question Id : 8318967812 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

Why is the equilibrium constant (K) temperature-dependent?

Options :

1. ✔ Because ΔG° depends on T

2. ✖ Because pressure affects K

3. ✖ Because entropy is temperature-independent

4. ✖ Because fugacity coefficients change with T

Question Number : 13 Question Id : 8318967813 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

Filter aids are added to the slurry prior to filtration in order to form _____.

Options :

1. Compact cakes of low porosity ✖

2. Cakes of increased porosity ✔

3. Crystalline cakes ✖

4. Baked cake ✖

Question Number : 14 Question Id : 8318967814 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

Pick the best difference between mixing and blending.

Options :

1. ✖ Mixing can only be done for a solid-solid system, while blending is done for solid-liquid mixture

2. ✔ Mixing is done for liquid-liquid, gas-liquid and solid-liquid systems, while blending is done for solid-solid mixture

3. ✖ Blending is done for liquid-liquid and gas-liquid systems, while mixing is done for solid-solid mixture

4. ✖ Mixing is done for liquid-liquid and gas-liquid systems, while blending is done for solid-solid mixture

Question Number : 15 Question Id : 8318967815 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

For transportation of boiler ash, which one of the following conveyors will be useful?

Options :

1. ✖ Belt Conveyor

2. ✔ Screw Conveyor

3. ✖ Pipe Conveyor

4. ✖ Bucket elevator

Question Number : 16 Question Id : 8318967816 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

Centrifugal pumps transfer energy from _____

Options :

1. ✔ rotor to fluid

2. ✖ fluid to rotor

3. ✖ draft to rotor

4. ✖ rotor to draft

Question Number : 17 Question Id : 8318967817 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

Which of the following is true, when operating speed is less than critical speed?

Options :

1. ✖ Bold grinding

2. ✖ Effective grinding

3. ✔ No grinding

4. ✖ Best grinding

Question Number : 18 Question Id : 8318967818 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

What is the term for the ratio of the actual flow rate to the maximum rated flow rate of a flow meter?

Options :

1. ✖ Repeatability

2. ✖ Linearity

3. ✔ Turndown ratio

4. ✖ Accuracy

Question Number : 19 Question Id : 8318967819 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

Which among the following is an assumption of Hagen-Poiseuille equation?

Options :

1. ✖ Fluid is uniform

2. ✔ Fluid is laminar

3. ✖ Fluid is turbulent

4. ✖ Fluid is compressible

Question Number : 20 Question Id : 8318967820 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

While a propeller gives an axial liquid circulation pattern, a turbine gives _____

Options :

1. ✖ Lateral

2. ✖ Parallel

3. ✖ Axial

4. ✔ Radial

Question Number : 21 Question Id : 8318967821 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

In S.I. system, the unit of filter medium resistance is _____

Options :

1. ✖ kg/m^2s

2. ✖ m^2/s

3. ✖ kg/m^3s

4. ✔ m^{-1}

Question Number : 22 Question Id : 8318967822 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

Surging is a phenomenon associated with:

Options :

1. ✖ Reciprocating pumps

2. ✔ Centrifugal compressors

3. ✖ Gear pumps

4. ✖ Diaphragm pumps

Question Number : 23 Question Id : 8318967823 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

What type of filtration relies on gravity to pull liquid through the filter medium?

Options :

1. ✖ Vacuum filtration

2. ✖ Centrifugal filtration

3. ✔ Gravity filtration

4. ✖ Pressure filtration

Question Number : 24 Question Id : 8318967824 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

Which one of the following is not a Newtonian fluid?

Options :

1. Water ✖

2. Toothpaste ✔

3. Glycerol ✖

4. Alcohol ✖

Question Number : 25 Question Id : 8318967825 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

The property of the fluid accounts for the major losses in pipes is _____.

Options :

1. ✖ density

2. ✖ specific gravity

3. ✔ viscosity

4. ✖ compressibility

Question Number : 26 Question Id : 8318967826 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

If we have very small dp/di < 0.01, then we may use _____.

Options :

1. ✖ Ergun Equation

2. ✔ Kozeny Carman Equation

3. ✖ Sieder Tate Equation

Arrhenius Equation

4. ✖

Question Number : 27 Question Id : 8318967827 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

Which of the following is true about the speed of the conveyor belt?

Options :

Fixed conveyors need not be shut down during any speed change

1. ✖

Adjustable speed belts can be changed only manually

2. ✖

Fixed speed drives can undergo minor speed changes

3. ✔

Variations of speed is not possible with conveyors

4. ✖

Question Number : 28 Question Id : 8318967828 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

The number of tube and shell passes of a 3-6 pass exchanger will be:

Options :

1. ✖ 3 and 6

2. ✖ 3 and 3

3. ✖ 3 and 5

4. ✔ 6 and 3

Question Number : 29 Question Id : 8318967829 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

A multiple effect evaporator has a capacity to process 40000 kg of solid caustic soda per day when it is concentrating from 10% to 25% solids. The water evaporated in kilograms per day is:

Options :

1. ✖ 800

2. ✔ 24000

3. ✖ 60000

4. ✖ 48000

Question Number : 30 Question Id : 8318967830 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

The surface temperature of a blackbody is 400 K. What will be the emissive power?

Options :

1. ✔ 1451.26 Wm^{-2}

2. ✖ 4521.56 Wm^{-2}

3. ✖ 2890 Wm^{-2}

4. ✖ 5500 Wm^{-2}

Question Number : 31 Question Id : 8318967831 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

A cavity with a small hole will always behave as a:

Options :

1. ✖ White body

2. ✖ Transparent body

3. ✔ Black body

4. ✖ Opaque body

Question Number : 32 Question Id : 8318967832 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

The temperature of the liquid is below the saturation temperature and boiling takes place only in vicinity of the heated surface. This type of boiling is known as:

Options :

1. ✔ Subcooled

2. ✖ Forces

3. ✖ Saturated

4. ✖ Pool

Question Number : 33 Question Id : 8318967833 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

Drop wise condensation usually occurs on:

Options :

1. ✔ Oily surface

2. ✖ Glazed surface

3. ✖ Smooth surface

4. ✖ Coated surface

Question Number : 34 Question Id : 8318967834 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

The dimensions of diffusion coefficient is given by:

Options :

1. ✖ $M L T^{-2}$

2. ✔ $L^2 T^{-1}$

3. ✖ $L T^{-1}$

4. ✖ $M L^{-2} T$

Question Number : 35 Question Id : 8318967835 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

Which of the following materials has the highest thermal conductivity?

Options :

1. ✖ Wood

2. ✖ Air

3. ✔ Copper

4. ✖ Glass

Question Number : 36 Question Id : 8318967836 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

The Wien's Displacement Law relates the wavelength at which maximum emission occurs to:

Options :

1. ✖ Emissivity of the surface

2. ✔ Absolute temperature of the blackbody

3. ✖ Surface area of the emitter

4. ✖ Stefan-Boltzmann constant

Question Number : 37 Question Id : 8318967837 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

A smaller HTU indicates:

Options :

1. ✖ Poor mass transfer efficiency

2. ✖ Higher column height required

3. ✔ Less height needed per transfer unit

4. ✖ Lower gas flow rates

Question Number : 38 Question Id : 8318967838 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

A hydraulic system operating at 80°C must be cooled to 45°C using a heat transfer oil. A water source of 30°C is available. The effectiveness of heat exchanger will be

Options :

1. ✔ 0.7

2. ✖ 0

3. ✖ 1

4. ✖ 0.5

Question Number : 39 Question Id : 8318967839 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

With respect to incident radiation, transmissivity varies with

Options :

1. ✖ Time

2. ✖ Temperature

3. ✖ Surface area

4. ✔ Wavelength

Question Number : 40 Question Id : 8318967840 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

The evaporative heat transfer coefficient is typically

Options :

1. ✔ Dependent on the latent heat of vaporization

2. ✖ Independent of air velocity

3. ✖ Higher for still air compared to moving air

4. ✖ Not affected by the liquid surface area

Question Number : 41 Question Id : 8318967841 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

Double-pipe heat exchangers are used for cases where the heat transfer area requirement is around

Options :

1. ✔ 10 to 20 m^2

2. ✖ 100 to 200 m^2

3. ✖ 500 to 1000 m^2

4. ✖ 5000 to 10000 m^2

Question Number : 42 Question Id : 8318967842 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

Consider a uniformly tapered steel rod of circular cross-section of 1 m length. The diameter of the rod at one end is 5 cm, and that at the other end is 2.5 cm. If the heat flux at the end of the larger cross-section is 2500 Kcal/m^2. hr the heat flux at the other end is equal to

Options :

1. ✖ 2500 kcal/m^2.h

2. ✖ 5000 kcal/m^2.h

3. ✖ 7500 kcal/m^2.h

4. ✔ 10,000 kcal/m^2.h

Question Number : 43 Question Id : 8318967843 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

What type of process is used to separate liquid mixtures based on differences in volatility?

Options :

1. ✖ Filtration

2. ✖ Extraction

3. ✖ Adsorption

4. ✔ Distillation

Question Number : 44 Question Id : 8318967844 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

According to penetration theory, the relationship between mass transfer coefficient (k) and diffusivity (D) is given by _____.

Options :

1. ✖ $k \alpha D^{1.5}$

2. ✖ $k \alpha D^{2}$

3. ✔ $k \alpha D^{0.5}$

4. ✖ $k \alpha D$

Question Number : 45 Question Id : 8318967845 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

Pendular state in drying of wet solids generally refers to:

Options :

1. ✖ Constant rate

2. ✖ First falling rate

3. ✔ Second falling rate

4. ✖ Equilibrium

Question Number : 46 Question Id : 8318967846 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

Which of the following equipment is essential in a simple distillation setup?

Options :

1. ✖ Separating funnel

2. ✔ Condenser

3. ✖ Chromatography column

4. ✖ Bunsen burner only

Question Number : 47 Question Id : 8318967847 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

Which of the following is NOT a type of distillation?

Options :

1. ✖ Simple distillation

2. ✖ Fractional distillation

3. ✖ Steam distillation

4. ✔ Magnetic distillation

Question Number : 48 Question Id : 8318967848 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

In a gas absorption process, the gas phase is typically:

Options :

1. ✖ The solvent

2. ✔ The solute

3. ✖ The carrier

4. ✖ The product

Question Number : 49 Question Id : 8318967849 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

The distribution of a solute between two immiscible liquids is governed by:

Options :

1. ✖ Henry's Law

2. ✖ Le Chatelier's Principle

Distribution coefficient

3. ✔

Dalton's Law

4. ✖

Question Number : 50 Question Id : 8318967850 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

Which of the following increases the efficiency of liquid-liquid extraction?

Options :

Multiple extractions with small volumes of solvent

1. ✔

Using the same solvent multiple times

2. ✖

Increasing the temperature excessively

3. ✖

Using highly miscible solvents

4. ✖

Question Number : 51 Question Id : 8318967851 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

What type of dryer is typically used for drying granular materials like grains?

Options :

1. ✖ Freeze dryer

2. ✔ Rotary dryer

3. ✖ Tunnel dryer

4. ✖ Tray dryer

Question Number : 52 Question Id : 8318967852 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

For temperature sensitive pharmaceuticals which one of the following drying methods is ideal?

Options :

Vacuum Rotary Drying

1. ✖

Agitated pan Drying

2. ✖

Vacuum Shelf Drying

3. ✖

Sublimation Drying

4. ✔

Question Number : 53 Question Id : 8318967853 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

Tannin is extracted from tree barks by leaching with:

Options :

Alkaline solution

1. ✖

Acidic solution

2. ✖

3. ✔ Hot water

4. ✖ Organic solvents

Question Number : 54 Question Id : 8318967854 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

In order to have efficient leaching of the desired material, the process Flaking is done to which of the following raw material:

Options :

1. ✖ Sugar extraction from Sugar beet

2. ✔ Oil extraction from vegetable seeds

3. ✖ Iron extraction from hematite

4. ✖ Aluminium extraction from bauxite

Question Number : 55 Question Id : 8318967855 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

The constant rate period in drying refers to the stage when:

Options :

1. ✖ Surface moisture is completely removed

2. ✖ Internal moisture starts to migrate

3. ✔ Drying rate remains constant

4. ✖ The temperature of the material drops

Question Number : 56 Question Id : 8318967856 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

What happens to the air in a cooling and dehumidification process?

Options :

1. ✖ Temperature and humidity increase

2. ✖ Temperature increases, humidity decreases

3. ✔ Temperature and humidity decrease

4. ✖ Only humidity increases

Question Number : 57 Question Id : 8318967857 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

The rate-determining step in a reaction mechanism is the one with:

Options :

1. ✖ The lowest activation energy

2. ✔ The highest activation energy

3. ✖ No energy barrier

4. ✖ The fastest rate

Question Number : 58 Question Id : 8318967858 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

When the conversion of a liquid phase reaction of first order occurring in a CSTR is 60%, and the molar feed rate is 10 mol/min, and the volume of the reactor is 0.50 litre, then the reaction rate in mol/lit/min will be:

Options :

1. ✔ 12

2. ✖ 18

3. ✖ 20

4. ✖ 6

Question Number : 59 Question Id : 8318967859 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

The reaction type for acid catalysed ester hydrolysis will be:

Options :

Zero order reaction

1. ✖

First order reaction

2. ✖

Pseudo first order reaction

3. ✔

Second order reaction

4. ✖

Question Number : 60 Question Id : 8318967860 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

Mixing of entering and exit fluid does not occur in which one of the following reactors?

Options :

Batch flow

1. ✖

Plug flow

2. ✔

3. ✖ Mixed Flow

4. ✖ Semi batch

Question Number : 61 Question Id : 8318967861 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

The Thiele modulus represents:

Options :

1. ✔ Surface reaction rate to diffusion rate

2. ✖ Overall reaction order

3. ✖ Mass transfer rate

4. ✖ Temperature profile

Question Number : 62 Question Id : 8318967862 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

In a heterogeneous catalytic reaction, the effectiveness factor is:

Options :

1. ✔ Ratio of actual rate to rate if no diffusion limitations

2. ✖ Ratio of surface area to catalyst weight

3. ✖ Mass transfer coefficient

4. ✖ Catalyst deactivation factor

Question Number : 63 Question Id : 8318967863 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

A zero-order reaction has a rate that is:

Options :

1. ✔ Independent of reactant concentration

2. ✖ Proportional to the reactant concentration

Proportional to the square of the reactant concentration

3. ✖

Inversely proportional to reactant concentration

4. ✖

Question Number : 64 Question Id : 8318967864 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

The Damköhler number (Da) relates:

Options :

Reaction rate to diffusion rate

1. ✔

Heat transfer to mass transfer

2. ✖

Reactor volume to flow rate

3. ✖

Pressure to temperature

4. ✖

Question Number : 65 Question Id : 8318967865 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

A catalyst increases the rate of reaction by:

Options :

1. Increasing activation energy ✖

2. Decreasing activation energy ✔

3. Changing the equilibrium constant ✖

4. Increasing temperature ✖

Question Number : 66 Question Id : 8318967866 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

The reaction $A+B \rightarrow C$ is elementary. If the concentration of A is doubled, the rate will:

Options :

1. Remain the same ✖

2. ✔ Double

3. ✖ Quadruple

4. ✖ Decrease by half

Question Number : 67 Question Id : 8318967867 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

For an exothermic reaction, increasing temperature will:

Options :

1. ✖ Shift the equilibrium toward products

2. ✖ Not affect the equilibrium

3. ✖ Increase activation energy

4. ✔ Shift the equilibrium toward reactants

Question Number : 68 Question Id : 8318967868 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

A reversible reaction $A \rightleftharpoons B$ reaches equilibrium when:

Options :

1. ✔ Forward rate = Reverse rate

2. ✖ All A is converted to B

3. ✖ Temperature is zero

4. ✖ Pressure is infinite

Question Number : 69 Question Id : 8318967869 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

For a first order reaction, the starting material reduces to ¼ th of its initial value after 20 min. The rate constant of the reaction will be: (Given ln 4 = 1.38)

Options :

1. ✔ $0.069\ min^{-1}$

2. ✖ $1.3844\ min^{-1}$

3. ✖ $4.3465\ min^{-1}$

4. ✖ $2.1674\ min^{-1}$

Question Number : 70 Question Id : 8318967870 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

If the formation of ammonia, shown below, is exothermic at 25°C, what will be the effect of increasing the system's temperature?

$$3H_2(g) + N_2(g) \leftrightarrow 2NH_3(g)$$

Options :

1. ✖ The value of K will increase

2. ✔ The value of K will decrease

3. ✖ The equilibrium will shift to the right

4. ✖ The $[H_2]$ will decrease

Question Number : 71 Question Id : 8318967871 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

Which model is commonly used to describe non-ideal flow with backmixing?

Options :

1. ✖ Ideal PFR model

2. ✖ Ideal CSTR model

3. ✔ Axial Dispersion Model

4. ✖ Batch reactor model

Question Number : 72 Question Id : 8318967872 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

The Arrhenius equation describes the effect of _____ on reaction rate.

Options :

1. ✖ Pressure

2. ✔ Temperature

3. ✖ Volume

4. ✖ Catalyst

Question Number : 73 Question Id : 8318967873 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

Which of the options correctly represents the laplace inverse of $2 / s^3$?

Options :

1. ✔ t^2

2. ✖ t^3

3. ✖ t^{-2}

4. ✖ t^{-3}

Question Number : 74 Question Id : 8318967874 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

What type of controller is used for the control of flow of liquid from a pump?

Options :

1. ✖ P controller

2. ✖ PD controller

3. ✖ PID controller

4. ✔ PI controller

Question Number : 75 Question Id : 8318967875 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

For a stable closed loop system, the gain at phase crossover frequency should always be:

Options :

1. ✖ < 20 dB

2. ✖ < 6 dB

3. ✔ > 0 dB

4. ✖ > 6 dB

Question Number : 76 Question Id : 8318967876 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

Gain margin and phase margin are measures of:

Options :

1. ✖ Process efficiency

2. ✖ Steady-state error

3. ✖ Controller cost

4. ✔ Relative stability

Question Number : 77 Question Id : 8318967877 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

Which control strategy is used to anticipate disturbances before they affect the process?

Options :

1. ✖ Feedback control

2. ✔ Feedforward control

3. ✖ Cascade control

4. ✖ On-off control

Question Number : 78 Question Id : 8318967878 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

Dead time in a process refers to:

Options :

1. ✖ Time taken to reach steady state

2. ✔ Time delay between input change and output response

3. ✖ Time constant of the system

4. ✖ Time for the controller to react

Question Number : 79 Question Id : 8318967879 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

In a heat exchanger, the primary controlled variable is often:

Options :

1. ✔ Outlet temperature

2. ✖ Inlet pressure

3. ✖ Pump speed

4. ✖ Pipe diameter

Question Number : 80 Question Id : 8318967880 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

Which one of the following is not a type of actuator?

Options :

1. ✖ Pneumatic

2. ✖ Hydraulic

3. ✖ Solenoid

4. ✔ Ultrasonic

Question Number : 81 Question Id : 8318967881 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

Which one of the following valves are best suitable for corrosive liquids?

Options :

1. ✖ Diaphragm valve

2. ✔ Rotary plug valve

3. ✖ Ball valve

4. ✖ Butterfly valve

Question Number : 82 Question Id : 8318967882 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

For highly accurate incremental position measurement which one of the following systems is used?

Options :

1. ✖ Ultrasonic devices

2. ✖ Hall effect Sensors

3. ✖ Microwave devices

4. ✔ Light interference laser

Question Number : 83 Question Id : 8318967883 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

The device that can change the format of a signal without changing the energy form is known as:

Options :

1. ✔ Converters

2. ✖ Transducers

3. ✖ Actuators

4. ✖ Controllers

Question Number : 84 Question Id : 8318967884 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

Smallest change which a sensor can detect is _____.

Options :

1. ✔ Resolution

2. ✖ Accuracy

3. ✖ Precision

4. ✖ Scale

Question Number : 85 Question Id : 8318967885 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

Which document provides detailed specifications for equipment and materials?

Options :

1. Process Flow Diagram ✖

2. Piping and Instrumentation Diagram ✖

3. Material Safety Data Sheet ✖

4. Equipment datasheets ✔

Question Number : 86 Question Id : 8318967886 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

Which of the following is the first step in plant design?

Options :

1. ✖ Detailed engineering

2. ✖ Process synthesis

3. ✔ Feasibility study

4. ✖ Piping and instrumentation design

Question Number : 87 Question Id : 8318967887 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

Which cost estimation method uses historical data from similar plants?

Options :

1. ✖ Detailed itemized estimation

2. ✔ Factored estimation

3. ✖ Lang factor method

4. ✖ Turnkey costing

Question Number : 88 Question Id : 8318967888 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

Fixed costs in plant operations include:

Options :

1. ✖ Raw materials

2. ✖ Labor wages

3. ✔ Depreciation and plant maintenance

4. ✖ Utility costs

Question Number : 89 Question Id : 8318967889 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

A pump has an installed cost of Rs. 40,000 and a 10-year estimated life. The salvage value of the pump is zero at the end of 10 years. The pump value (in rupees) after depreciation y the double declining balance method, at the end of 6 years is:

Options :

1. ✖ 4295

2. ✔ 10486

3. ✖ 21257

4. ✖ 37600

Question Number : 90 Question Id : 8318967890 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

Due to a 20% drop in the product selling price, the pay-back period of a new plant increased to 1.5 times that estimated initially, the production cost and the production rate remaining unchanged. If the production cost is Cp and the new selling price is Cs, then Cp/Cs is:

Options :

1. ✖ 0.2

2. ✔ 0.4

3. ✖ 0.5

4. ✖ 0.6

Question Number : 91 Question Id : 8318967891 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

Which of the following is a limitation of the payback period method?

Options :

1. ✖ It considers the time value of money

2. ✔ It ignores cash flows beyond the payback period

3. ✖ It is difficult to calculate

4. ✖ It always matches the IRR results

Question Number : 92 Question Id : 8318967892 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

Profitability calculation method that includes time value of money is:

Options :

1. ✖ Payback period

2. ✖ Net return

3. ✖ Rate of return on investment

4. ✔ Net present worth

Question Number : 93 Question Id : 8318967893 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

For a business if the net profit is 10 Lakhs and Total capital investment is 5 crore rupees, then the return on investment in percentage will be:

Options :

1. ✖ 5%

2. ✖ 3%

3. ✔ 2%

4. ✖ 50%

Question Number : 94 Question Id : 8318967894 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

A compressor design primarily depends on:

Options :

1. ✖ Suction pressure

2. ✖ Discharge pressure

3. ✔ Pressure ratio

4. ✖ Compressor size

Question Number : 95 Question Id : 8318967895 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

Equipment costs generally follow the relation:

Options :

1. ✖ Linear with size

2. ✔ Power law with size

3. ✖ Exponential with size

4. ✖ Inversely with size

Question Number : 96 Question Id : 8318967896 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

For a commercial fertilizer designated as 5-20-20 the numbers indicate what information about the composition?

Options :

1. ✖ 5% K, 20% N, 20% P

2. ✖ 5% N, 20% Na, 20% S

3. ✔ 5% N, 20% P_2O_5, 20% K_2O

4. ✖ 5% K_2O, 20% N, 20% P_2O_5

Question Number : 97 Question Id : 8318967897 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

Polythene is the polymer obtained during polymerization of

Options :

1. ✖ Propylene

2. ✖ Acetylene

3. ✖ Methylene

4. ✔ Ethylene

Question Number : 98 Question Id : 8318967898 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

In the Haber process of ammonia preparation, the catalyst and the promoter are

Options :

1. ✔ Reduced Fe_2O_3 and Al_2O_3 respectively

2. ✖ Reduced Fe_2O_3 and Mn_2O_3 respectively

3. ✖ Reduced Al_2O_3 and Fe_2O_3 respectively

4. ✖ Reduced Mn_2O_3 and Al_2O_3 respectively

Question Number : 99 Question Id : 8318967899 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

The Kraft process of chemical pulping involves a mixture of two chemicals in water which are?

Options :

1. ✔ NaOH, and Na_2S

2. ✖ NaOH, and NaCl

3. ✖ NaCl, and Na_2S

4. ✖ NaOH, and K_2S

Question Number : 100 Question Id : 8318967900 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

LPG contains mostly:

Options :

1. ✖ Methane, Ethane, and Propane

2. ✖ Ethane, Propane, and Butane

3. ✔ Propane, Butane, and Isobutene

4. ✖ Methane

Question Number : 101 Question Id : 8318967901 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

For which Refractory material the thermal conductivity decreases with increasing temperature?

Options :

1. ✖ Zirconia

2. ✖ Silica

3. ✔ Magnesite

4. ✖ Alumina

Question Number : 102 Question Id : 8318967902 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

Which of the following equipment has the maximum capital cost contribution in a chemical plant?

Options :

1. ✖ Pumps

2. ✖ Compressors

3. ✖ Heat exchangers

4. ✔ Reactors

Question Number : 103 Question Id : 8318967903 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

Hydrogenation is the conversion of unsaturated acid groups into the saturated using _____ catalyst.

Options :

1. ✖ Fe

2. ✖ Zn

3. ✔ Ti

4. ✖ Ni

Question Number : 104 Question Id : 8318967904 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

Which of the following is fully synthetic first produced fibre?

Options :

1. ✖ Jute

2. ✖ Acrylic

3. ✖ Rayon

4. ✔ Nylon

Question Number : 105 Question Id : 8318967905 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

The term "circular economy" in chemical technology refers to:

Options :

1. ✖ Linear production and disposal

2. ✖ Increasing single-use plastics

3. ✖ Maximizing waste generation

4. ✔ Reusing and recycling materials

Question Number : 106 Question Id : 8318967906 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

_____ is not an intermediate distillate product in petroleum refining.

Options :

1. ✖ Heavy fuel oils

2. ✖ Diesel oils

3. ✔ Lubricating oil

4. ✖ Gas oil

Question Number : 107 Question Id : 8318967907 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

The Ostwald process is used to produce:

Options :

1. ✔ Nitric acid

2. ✖ Sulfuric acid

3. ✖ Hydrochloric acid

4. ✖ Phosphoric acid

Question Number : 108 Question Id : 8318967908 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

_____ is the waste liquor from the Kraft pulping process after pulping is completed.

Options :

1. White liquor ✖

2. Black liquor ✔

3. Brown liquor ✖

4. Red liquor ✖

Question Number : 109 Question Id : 8318967909 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

_____ includes the largest fraction of petroleum crude.

Options :

n-paraffin series

1. ✔

Naphthene series

2. ✖

Asphalts

3. ✖

Isoparaffin series

4. ✖

Question Number : 110 Question Id : 8318967910 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

_____ act as a catalyst in anionic polymerisation.

Options :

Grignard reagent

1. ✔

Lewis acids

2. ✖

Benzoyl peroxide

3. ✖

AIBN

4. ✖

Question Number : 111 Question Id : 8318967911 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

If the systems of equations $3x - 2y + z = 0, 5x + ay + 15z = 0,$

$x + 2y - 3z = 0$ have non-zero solution, then $a =$ _____

Options :

-2

1. ✖

2

2. ✖

-14

3. ✔

14

4. ✖

Question Number : 112 Question Id : 8318967912 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

If the matrix $A = \begin{pmatrix} 3 & -1 & 1 \\ -1 & 5 & -1 \\ 1 & -1 & 3 \end{pmatrix}$ has three distinct eigenvalues and one of its eigenvectors is $\begin{pmatrix} 1 \\ 0 \\ -1 \end{pmatrix}$, then which of the following can be another eigenvector of A?

Options :

1. ✖ $\begin{pmatrix} -1 \\ 0 \\ 1 \end{pmatrix}$

2. ✖ $\begin{pmatrix} -1 \\ 0 \\ 2 \end{pmatrix}$

3. ✖ $\begin{pmatrix} 1 \\ 1 \\ -1 \end{pmatrix}$

4. ✔ $\begin{pmatrix} 1 \\ -2 \\ 1 \end{pmatrix}$

Question Number : 113 Question Id : 8318967913 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

Let $f(x) = x^3 - \frac{9}{2}x^2 + 6x - 2$ be a function defined on the closed interval [0,3]. Then, the global maximum value of $f(x)$ is _____

Options :

1. ✖ 4.5

2. ✖ 0.5

3. ✔ 2.5

4. ✖ 3.0

Question Number : 114 Question Id : 8318967914 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

If $\vec{F}(x,y,z) = 3x^2y\hat{i} + 5y^2z\hat{j} - 8xyz\hat{k}$ is a continuously differentiable vector field, then the curl of $\vec{F}$ at (1,1,1) is _____

Options :

1. ✖ $-13\hat{i} - 8\hat{j} - 3\hat{k}$

2. ✖ $-13\hat{i} + 8\hat{j} + 3\hat{k}$

3. ✔ $-13\hat{i} + 8\hat{j} - 3\hat{k}$

4. ✖ $13\hat{i} + 8\hat{j} - 3\hat{k}$

Question Number : 115 Question Id : 8318967915 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

If $\vec{F} = x(x^2 + y^2 + z^2)\hat{i} + 2y(x^2 + y^2 + z^2)\hat{j} + 3z(x^2 + y^2 + z^2)\hat{k}$, then $div\vec{F}$ at (1,1,1) is equal to _____

Options :

1. ✖ 12

2. ✖ 21

3. ✔ 30

4. ✖ 33

Question Number : 116 Question Id : 8318967916 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

Consider the ordinary differential equation $x^2\frac{d^2y}{dx^2} - 2x\frac{dy}{dx} + 2y = 0$ with $y(x)$ as a general solution. Given the values of $y(1) = 1$, $y(2) = 5$, the value of $y(3)$ is equal to _____

Options :

1. ✖ 9

2. ✔ 12

3. ✖ 15

4. ✖ -15

Question Number : 117 Question Id : 8318967917 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

If the Laplace transform of a function $f(t)$ is given by $\frac{2s+1}{(s+1)(s+2)}$, then $f(0)$ is equal to _____

Options :

1. ✔ 2

2. ✖ 4

3. ✖ -4

4. ✖ $3e-1$

Question Number : 118 Question Id : 8318967918 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Let z be a complex variable and $C: |z| = 3$ be a circle in the complex plane. Then, $\oint_C \frac{z^2}{(z-1)^2(z+2)} dz =$ _____

Options :

1. ✖ πi

2. ✔ $2\pi i$

3. ✖ 0

4. ✖ $\pi(2+i)$

Question Number : 119 Question Id : 8318967919 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Correct Marks : 1 Wrong Marks : 0

The probability of a component being defective is 0.01. There are 100 such components in a machine. Then the probability of two or more defective components in the machine is _____

Options :

1. ✖ $1 - e^{-1}$

2. ✖ $2e^{-1}$

3. ✔ $1 - 2e^{-1}$

4. ✖ e^{-1}

Question Number : 120 Question Id : 8318967920 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Correct Marks : 1 Wrong Marks : 0

The value of the integral $\int_1^3 \frac{2}{x} dx$, when evaluated by using

Simpson's $\frac{1}{3}$ rule on two equal subintervals each of length 1, is _____

Options :

1. ✖ 2.00

2. ✖ 2.24

3. ✖ 2.19

4. ✔ 2.22