1000 lb_m-ft/min is equal to X kg-cm/s², where

Options:
- X=3.73
- X=3.93
- X=3.63
- X=3.83

If the approximate molar composition of air is 79% N₂ and 21% O₂, then the mass composition of air is

Options:
76.7% N₂ and 23.3% O₂
76.1% N₂ and 23.9% O₂
78.1% N₂ and 21.9% O₂
77.7% N₂ and 22.3% O₂

Question Number : 3  Question Id : 8273473  Question Type : MCQ

One litre of an alcohol (density=810 kg/m³) is mixed with one litre of water (density=1005 kg/m³) to form a solution (density=960 kg/m³), find the total volume of the solution?
Options :
1.99 litre
1.89 litre
2.04 litre
2.13 litre

Question Number : 4  Question Id : 8273474  Question Type : MCQ

One (short) ton is approximately equal to
Options :
1007 kg
950 kg
907 kg
1000 kg

Question Number : 5  Question Id : 8273475  Question Type : MCQ

Value of specific heat ratio for monoatomic gases is
Options :
1
1.44
2
1.66

Question Number : 6  Question Id : 8273476  Question Type : MCQ

Isotonic solutions have the same
Options :
Viscosity
Normality
Molar concentration
specific heat ratio

Question Number : 7  Question Id : 8273477  Question Type : MCQ

Which of the following has the least effect on the solubility of gas in a solvent
Temperature
Pressure
Nature of gas
Nature of solvent

Question Number : 8  Question Id : 8273478  Question Type : MCQ

Thickness of thermal boundary layer is more compared to that of hydrodynamic boundary layer, when the value of Prandtl number is

Options :
1
>1
<1
>5

Question Number : 9  Question Id : 8273479  Question Type : MCQ

An example of Bingham plastic is

Options :
Gas
Non-colloidal solution
Sewage sludge
Rubber latex

Question Number : 10  Question Id : 82734710  Question Type : MCQ

For laminar flow in a pipe, the value of momentum correction factor (\( \beta \))

Options :
3/4
4/3
0
1

Question Number : 11  Question Id : 82734711  Question Type : MCQ

Reynolds analogy is

Options :
\([\text{Nu} / (\text{RePr}) ] + f/2\)
\([\text{Nu} / (\text{RePr})] + 2/f\)
\([\text{Re} / (\text{NuPr})] + f/2\)
\([\text{Pr} / (\text{ReNu})] + f/2\)

Question Number : 12  Question Id : 82734712  Question Type : MCQ

Creeping flow is obtained only at Re of the order of
Question Number : 13  Question Id : 82734713  Question Type : MCQ

Viscosity of gases increases with
Options :
increase in temperature
decrease in temperature
independent of temperature
first decreases up to 150 °C and then increases with temperature

Question Number : 14  Question Id : 82734714  Question Type : MCQ

For the annular flow, surface of zero momentum is closer to
Options :
Outer wall
Inner wall
Exactly in between
Close to outer wall

Question Number : 15  Question Id : 82734715  Question Type : MCQ

For liquid flow through a packed bed, the superficial velocity as compared to average velocity through the channel in the bed is
Options :
more
less
equal
independent of porosity

Question Number : 16  Question Id : 82734716  Question Type : MCQ

A 100 kmol mixture of benzene and toluene containing 60 mol% benzene is separated into top product (D) containing 80 mol% benzene and a bottom product (B) containing 20 mol% benzene. What is the amount of top product (D)?
Options :
50 kmol
25 kmol
33.3 kmol
66.7 kmol

Question Number : 17  Question Id : 82734717  Question Type : MCQ
Which of the following statement is true

Options:
Dew point is dependent of dry bulb temperature
Dew point is independent of dry bulb temperature
Dew point is dependent on both dry bulb temperature and wet bulb temperature
Dew point is dependent of dry bulb temperature and independent on wet bulb temperature

Question Number : 18  Question Id : 82734718  Question Type : MCQ

In the froth floatation process, pine oil and cresylic acid are used as

Options:
frother
 collector
depressor
 conditioner

Question Number : 19  Question Id : 82734719  Question Type : MCQ

Bond number is the ratio of

Options:
Gravity force to surface tension force
Pressure force to surface tension force
Gravity force to pressure force
Viscous force to surface tension force

Question Number : 20  Question Id : 82734720  Question Type : MCQ

Colloid mills achieve size reduction mainly by

Options:
impact
attrition
cutting
compression

Question Number : 21  Question Id : 82734721  Question Type : MCQ

Solid particles separation based on difference in their flow velocities through fluids is termed as

Options:
elutriation
sedimentation
classification
clarification
The most commonly used dispersing agents to prevent flocculation are
Options:
carbonates
bi-carbonates
sulphates
silicates & phosphates

The most suitable equipment for the transportation of 200 mesh size particles is
Options:
belt conveyor
pneumatic conveyor
screw conveyor
bucket conveyor

Wet sieving is employed, when the product contains
Options:
abrasive materials in large quantity
coarse materials in large quantity
non-sticky materials in large quantity
very fine materials in large quantity

Energy consumed for crushing one ton of material ranges from
Options:
0.01 to 0.1 kWh
0.5 to 1.5 kWh
2 to 3.5 kWh
4 to 5 kWh

The critical radius for the curved insulation
Options:
remains unaffected with change in the thermal conductivity of insulation
increases with decrease in the thermal conductivity of insulation
decreases with decrease in the thermal conductivity of insulation
increases linearly with decrease in the thermal conductivity of insulation
Question Number : 27  Question Id : 82734727  Question Type : MCQ

In shell and tube heat exchangers, the fluid having corrosive and fouling tendency is routed through
Options :
the shell
either shell or tube but at very slow velocity
the shell, when the flow is counter-current; and the tube, when the flow is co-current
the tube due to easier internal cleaning of the tubes.

Question Number : 28  Question Id : 82734728  Question Type : MCQ

Which tube arrangement in heat exchangers facilitates highest heat transfer rate?
Options :
Triangular pitch
Square pitch
Diagonal square pitch
Heat transfer rate is independent of tube arrangement

Question Number : 29  Question Id : 82734729  Question Type : MCQ

Stefan boltzmann constant in \( \text{W/m}^2\text{K}^4 \) is
Options :
3.669x10^{-9}
4.669x10^{-9}
5.669x10^{-9}
6.669x10^{-9}

Question Number : 30  Question Id : 82734730  Question Type : MCQ

Which of the statement is true
Options :
Thermal conductivity of substance depends on temperature
Thermal conductivity of metal increases with temperature
Thermal conductivity of gases are generally higher
Thermal conductivity of gases are generally lower

Question Number : 31  Question Id : 82734731  Question Type : MCQ

In which of the following membrane process-driving force is not pressure gradient
Options :
Microfiltration
Ultrafiltration
Reverse osmosis
Dialysis

Question Number : 32  Question Id : 82734732  Question Type : MCQ

Eutonic point is used in
Options :
Distillation
Evaporation
Sublimation
Crystallisation

Question Number : 33  Question Id : 82734733  Question Type : MCQ

Heuristic rules is used in
Options :
Distillation
Evaporation
Crystallisation
Liquid-liquid extraction

Question Number : 34  Question Id : 82734734  Question Type : MCQ

If atmospheric temperature and the dew point are same, than the relative humidity is
Options :
zero
50 %
100 %
No relation

Question Number : 35  Question Id : 82734735  Question Type : MCQ

The minimum tray spacing in distillation column of diameter less than 3 ft is normally
Options :
6 inch
12 inch
18 inch
24 inch

Question Number : 36  Question Id : 82734736  Question Type : MCQ

Which of the following efficiency can be greater than 100%?
Options :
Point efficiency
Overall efficiency
Murphree plate efficiency
None of the other option
Question Number : 37  Question Id : 82734737  Question Type : MCQ

If the pressure of the gas is increased the value of diffusivity
Options :
- increases
- decreases
- remains constant
- Any of the other option

Question Number : 38  Question Id : 82734738  Question Type : MCQ

Which of the following fundamental thermodynamics equations is not correct?
Options :
\[ dU = T \, dS - P \, dV \]
\[ dH = T \, dS + V \, dP \]
\[ dA = -P \, dV + S \, dT \]
\[ dG = V \, dP - S \, dT \]

Question Number : 39  Question Id : 82734739  Question Type : MCQ

Gibbs phase rule relates degree of freedom (F), number of components (C) and number of phases (P) by following equation:
Options :
- F-P-C-2=0
- F-P+C-2=0
- F+P-C+2=0
- F+P-C-2=0

Question Number : 40  Question Id : 82734740  Question Type : MCQ

Compressibility factor for almost all the gases are approximately same at the
Options :
- same pressure
- same pressure and temperature
- same reduced pressure and reduced temperature
- same critical pressure and critical temperature

Question Number : 41  Question Id : 82734741  Question Type : MCQ

Which of the following equation is not used for the prediction of activity coefficients from experimental data
Options :
- Van Laar equation
- Van’t Hoff equation
- Wilson equation
Margules equation

Question Number : 42  Question Id : 82734742  Question Type : MCQ

As per Duhem's theorem, for any closed system formed initially from given masses of prescribed chemical species, the equilibrium state is completely determined when ________ independent variables are fixed period.

Options:
One
Two
Three
Four

Question Number : 43  Question Id : 82734743  Question Type : MCQ

Partial molal quantities are used during study of

Options:
Pure component
Ideal gases
Ideal solutions
Non-ideal mixtures

Question Number : 44  Question Id : 82734744  Question Type : MCQ

Which of the following is not a refrigerant?

Options:
Furan
Ammonia
Carbon di-oxide
Sulfur di-oxide

Question Number : 45  Question Id : 82734745  Question Type : MCQ

Which of the following gases most closely behaves as an ideal gas?

Options:
Nitrogen
Hydrogen
Helium
Oxygen

Question Number : 46  Question Id : 82734746  Question Type : MCQ

For an ideal gas, difference between adiabatic compressibility and isothermal compressibility is

Options:
Positive
Negative
Zero
Infinite

Question Number : 47  Question Id : 82734747  Question Type : MCQ

Colligative means depending
Options :
on the number of particles
on the nature of particles
on both number and nature of particles
on identity of individual particles

Question Number : 48  Question Id : 82734748  Question Type : MCQ

Lewis-Randall rule leads to Raoult’s law at
Options :
low temperature
low pressure
very high temperature
very high pressure

Question Number : 49  Question Id : 82734749  Question Type : MCQ

For a pure substance, Gibbs free energy per mole is equal to
Options :
fugacity
latent heat of vaporization
heat capacity
chemical potential

Question Number : 50  Question Id : 82734750  Question Type : MCQ

In the Claude gas liquefaction process, cooling is done
Options :
by expansion
at constant pressure
at constant temperature
by throttling

Question Number : 51  Question Id : 82734751  Question Type : MCQ

For same residence time, maximum conversion will be obtained in which of the following cases
Options :
Single tubular reactor (volume=2V)
Single stirred tank reactor (volume=2V)
Two stirred tank reactors (volume=V each)
Stirred tank reactor followed by single tubular reactor (volume=V each)

Question Number : 52  Question Id : 82734752  Question Type : MCQ

For auto-thermal reaction, maximum conversion will be obtained in which of the following cases
Options :
Batch reactor
Semi-batch reactor
Stirred tank reactor
Plug flow reactor

Question Number : 53  Question Id : 82734753  Question Type : MCQ

For autocatalytic reaction, maximum conversion will be obtained in which of the following cases
Options :
Stirred tank reactors in series
Plug flow reactors in series
Plug flow reactor followed by stirred tank reactor
Stirred tank reactor followed by plug flow reactor

Question Number : 54  Question Id : 82734754  Question Type : MCQ

For which of the following reactions, reaction rate does not decreases much as the reaction proceeds
Options :
Catalytic
Auto-catalytic
Parallel
Series

Question Number : 55  Question Id : 82734755  Question Type : MCQ

For reactions carried out in plug flow reactor, dispersion number is
Options :
0 (zero)
1
-1
∞ (infinity)

Question Number : 56  Question Id : 82734756  Question Type : MCQ
Effectiveness factor of a catalyst pellet is a measure of the
Options:
- gas film diffusion resistance
- bulk resistance
- pore diffusion resistance
- chemical reaction resistance

Question Number: 57  Question Id: 82734757  Question Type: MCQ

Which gas is used for determining the surface area of the catalysts
Options:
- Nitrogen
- Hydrogen
- Helium
- Carbon di-oxide

Question Number: 58  Question Id: 82734758  Question Type: MCQ

Relationship between effective diffusivity ($D_E$), molecular diffusivity ($D_M$) and Knudsen diffusivity ($D_K$) is given as:
Options:
- $D_E = D_M / D_K$
- $D_E = D_M \times D_K$
- $(1/D_E) = (1/D_M) + (1/D_K)$
- $D_E = D_M + D_K$

Question Number: 59  Question Id: 82734759  Question Type: MCQ

Reaction with high activation energy are
Options:
- always non-spontaneous
- always spontaneous
- fast
- slow

Question Number: 60  Question Id: 82734760  Question Type: MCQ

A reactor which has non-uniform and steady concentration is
Options:
- Batch reactor
- Semi-batch reactor
- Plug-flow reactor
- Stirred tank reactor

Question Number: 61  Question Id: 82734761  Question Type: MCQ
Flow profile is laminar in
Options:
Batch reactor
Tubular reactor
Plug-flow reactor
Stirred tank reactor

Question Number : 62  Question Id : 82734762  Question Type : MCQ

Fanning equation is applicable for _______ region flow.
Options:
transition
laminar
turbulent
laminar and turbulent

Question Number : 63  Question Id : 82734763  Question Type : MCQ

Which of the following equations is valid for laminar flow of a fluid through a packed bed?
Options:
Fanning equation
Kozney – Karman equation
Hagen – Poiseuille equation
Blake – Plummer equation

Question Number : 64  Question Id : 82734764  Question Type : MCQ

Which of the following controllers has the least maximum deviation?
Options:
P controller
PI controller
PID controller
PD controller

Question Number : 65  Question Id : 82734765  Question Type : MCQ

In Bode stability criterion, amplitude ratio at 180° should be
Options:
1
< 1
> 1
0

Question Number : 66  Question Id : 82734766  Question Type : MCQ

Frequency response of a second order system will be sinusoidal when
Options:
Damping coefficient is zero
It is under-damped
It is over-damped
It is critically-damped

Question Number: 67 Question Id: 82734767 Question Type: MCQ

In the second order underdamped system

Options:
Decay ratio = overshoot
Decay ratio = (overshoot)^2
Decay ratio = (overshoot)^0.33
Decay ratio = (overshoot)^0.5

Question Number: 68 Question Id: 82734768 Question Type: MCQ

Pyranometer is used for measuring

Options:
Measuring temperatures from 500 to 1000 °C
Measuring temperatures from 0 to 500 °C
Measuring solar radiation flux
Collecting solar energy

Question Number: 69 Question Id: 82734769 Question Type: MCQ

Solenoid valve works like

Options:
P controller
P-I controller
P-D controller
On-off controller

Question Number: 70 Question Id: 82734770 Question Type: MCQ

The frequency at which maximum amplitude ratio is attained is called

Options:
resonant frequency
corner frequency
cross-over frequency
natural frequency

Question Number: 71 Question Id: 82734771 Question Type: MCQ
Response of a linear control system for a change in set point is called
Options:
Frequency response
servo problem
transient response
regulator problem

Question Number : 72  Question Id : 82734772  Question Type : MCQ

Effective and nominal interest rates are equal when the interest is compounded
Options:
Fortnightly
Half-yearly
Monthly
Annually

Question Number : 73  Question Id : 82734773  Question Type : MCQ

Six-tenth factor rule is used for estimating the
Options:
Utilities cost
Piping cost
Equipment cost by scaling
Equipment installment cost

Question Number : 74  Question Id : 82734774  Question Type : MCQ

Profit is obtained by subtracting ____________ from revenue
Options:
Total cost
Fixed cost
Operating cost
Book value

Question Number : 75  Question Id : 82734775  Question Type : MCQ

Break-even point is the intersection of
Options:
Total cost and fixed cost
Fixed cost and operating cost
Fixed cost and sales revenues
Total cost and sales revenues

Question Number : 76  Question Id : 82734776  Question Type : MCQ
Test for determination of BOD₃ is carried out at
Options:
20 °C
23 °C
27 °C
30 °C

In India, the pH value of rain lies in the range of
Options:
5-6
6-7
3-4
4-5

Mesophilic temperature range is from
Options:
0-10 °C
12-20 °C
25-42 °C
45-60 °C

Impurities in the size range of 1-1000 micro-meters are suggested to be treated by
Options:
Ultra-filtration
Micro-filtration
Nano-filtration
Reverse Osmosis

Impurities in the size range of 0.001-1 micro-meters are considered as
Options:
Dissolved impurities
Colloidal impurities
Suspended impurities
Non-colloidal impurities
6 ml of wastewater is diluted to 300 ml distilled water in standard BOD bottle. Initial DO in the bottle is determined to be 8.5 mg/l. DO after 5 days at 20 C is found to be 5 mg/l. BOD₅ of wastewater is
Options:
150 mg/l
125 mg/l
175 mg/l
200 mg/l

Question Number: 82  Question Id: 82734782  Question Type: MCQ
Mercury pollution is mainly due to the emission from
Options:
Petrochemical industry
Thermal power plant
Electroplating industry
Paint industry

Question Number: 83  Question Id: 82734783  Question Type: MCQ
Hazardous waste could be incinerated in
Options:
Pulp and paper industry
Electroplating industry
Cement industry
Petrochemical industry

Question Number: 84  Question Id: 82734784  Question Type: MCQ
If the flow through a circular clarifier is 500 cubic meter per hour and that the surface overflow rate is 50 m³/m²-day. What should be the clarifier diameter?
Options:
17.48 m
16.77 m
19.24 m
20.25 m

Question Number: 85  Question Id: 82734785  Question Type: MCQ
Bhopal gas tragedy was caused by the release of
Options:
EIC
BIC
MIC
MIG
Limestone is predominantly
Options:
magnesium carbonate
calcium carbonate
sodium carbonate
potassium carbonate

Coke oven gas is composed of
Options:
CO and CO₂
CH₄ and C₂H₄
CH₄ and CO₂
CO, N₂ and H₂

The high temperature carbonization of coal is carried out at
Options:
900-1150°C
1250-1500°C
600-800°C
175-275°C

Producer gas is obtained by
Options:
thermal cracking of naphtha
passing steam and air through red hot coke
passing air through red hot coke
passing steam through red hot coke

Raw material for the manufacture of calcium carbide are
Options:
limestone and coke
limestone and slaked lime
limestone and sand
limestone and caustic soda
From which of the processes propylene is recovered in the refinery
Options:
Alkylation
Catalytic dewaxing
Catalytic reforming
Fluid catalytic cracking

Question Number : 92  Question Id : 82734792  Question Type : MCQ

For storing 100% sulphuric acid which of the following material will be used
Options:
Ordinary carbon steel
Aluminum
SS 304
Lead

Question Number : 93  Question Id : 82734793  Question Type : MCQ

Which of the following is used as feedstock in manufacture of linear alkyl benzene
Options:
Light diesel
Light cycle oil
Kerosene
Gas oil

Question Number : 94  Question Id : 82734794  Question Type : MCQ

Ter amyl methyl ether (TAME) is made by etherification of
Options:
Isoprene
Cyclopentadiene
Dicyclopentadiene
2-methyl butene

Question Number : 95  Question Id : 82734795  Question Type : MCQ

Which of the following is used for the manufacture of terephthalic acid
Options:
p-xylene
m-xylene
o-xylene
Mixed xylenes

Question Number : 96  Question Id : 82734796  Question Type : MCQ
Pyrolysis gasoline is obtained from which of the following process
Options :
Hydrocracking
Fluid catalytic cracking
Naphtha cracking
Catalytic reforming

Question Number : 97  Question Id : 82734797  Question Type : MCQ

Desulfurization of liquid fuels in the refinery is carried out using
Options :
Adsorptive desulfurization
Hydro desulfurization
Oxidative desulfurization
Photo desulfurization

Question Number : 98  Question Id : 82734798  Question Type : MCQ

Most commonly used rubber vulcanization agent is
Options :
Nickel
Sulfur
Bromine
Chlorine

Question Number : 99  Question Id : 82734799  Question Type : MCQ

Which of the following plastic has lowest cost
Options :
Polythene
PVC
Teflon
Bakelite

Question Number : 100  Question Id : 827347100  Question Type : MCQ

Zeigler-Natta catalyst is used in the manufacture of
Options :
Vinyl acetate
Styrene
PTFE
Propylene