PROVISIONAL ANSWER KEY

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Department Travancore Sugars and Chemicals Ltd

Question1:-Purging is done

    A:-To recover heat

    B:-To avoid accumulation of inert

    C:-To increase the yield

    D:-To control the concentration accurately

    Correct Answer:- Option-B

Question2:-Molality of a 20% NaOH solution is

    A:-20 M

    B:-6.25 M

    C:-0.00625 M

    D:-2 M

    Correct Answer:- Option-B

Question3:-Clapeyron equation relates

    A:-Vapour pressure with temperature

    B:-Vapour pressure with concentration

    C:-Vapour pressure with density

    D:-Vapour pressure with compressibility factor

    Correct Answer:- Option-A

Question4:-When two immiscible liquids are mixed, the boiling point of resulting mixture

    A:-Is greater than the boiling point of both pure liquids

    B:-Is less than the boiling point of more volatile liquid

    C:-Lies between the boiling point of the pure liquids

    D:-May be less than or greater than the boiling point of low volatile liquid

    Correct Answer:- Option-B

Question5:-Fugacity and pressure are numerically equal when the gas is

    A:-At high pressure

    B:-At standard state

C:-Ideal state

D:-Low pressure

Correct Answer:- Option-C

Question6:-Entropy of perfect crystalline substance at absolute zero is

A:-Zero

B:-Negative

C:-Positive

D:-Can't say

Correct Answer:- Option-A

Question7:-Heat capacity of a gas is given by $Cp = a + bT + CT^2$, where Cp is in kJ/kmol K and T in K. Dimensions of constant a and b respectively are

A:-Dimensionless

B:-kJ/kmolK, kJ/kmol$_{K^2}$

C:-kJ/kmolK, kJ/kmolK

D:-kJ/kmol$_{K^2}$, kJ/kmol$_{K^2}$

Correct Answer:- Option-B

Question8:-Gross heating value of a fuel is obtained when water formed during combustion is

A:-In the vapour state

B:-In the liquid state

C:-In the vapour state or liquid state

D:-Negligible

Correct Answer:- Option-B

Question9:-The point at which both liquid and gas phases are identical is called

A:-Triple point

B:-Saturation point

C:-Critical point

D:-Freezing point

Correct Answer:- Option-C

Question10:-Seeds containing 30% oil and rest inerts is extracted with hexane. The underflow analysed 10% oil and 20% hexane. The percent recovery of oil is

A:-25%

B:-33.33%

C:-50%

D:-66.67%

Correct Answer:- Option-D

Question11:-The dimensions of kinematic viscosity is

A:-L^2T^{-1}

B:-LT^{-1}

C:-$ML^{-1}T^{-1}$

D:-MLT^{-1}

Correct Answer:- Option-A

Question12:-Loss due to sudden contraction is proportional to

A:-Velocity head

B:-Density

C:-Viscosity

D:-Gravity

Correct Answer:- Option-A

Question13:-In laminar flow through a pipe, if the diameter of the pipe is reduced to half, for a constant volumetric flow rate, pressure drop across the pipe

A:-Increases two times

B:-Decreases two times

C:-Decreases 16 times

D:-Increases 16 times

Correct Answer:- Option-D

Question14:-In Venturimeter pressure loss is

A:-more than orifice meter

B:-less than orifice meter

C:-same as orifice meter

D:-can't say

Correct Answer:- Option-B

Question15:-Cavitation in a centrifugal pump can be prevented by

A:-maintaining suction head equal to developed head

B:-maintaining suction head lower than the vapour pressure

C:-maintaining suction head sufficiently greater than the vapour pressure

D:-by proper sizing of suction line

Correct Answer:- Option-C

Question16:-Priming is required for

A:-Centrifugal pump

B:-Plunger pump

C:-Piston pumps

D:-All pumps

Correct Answer:- Option-A

Question17:-Hydraulic radius for a circular pipe of diameter D is given by

A:-D/4

B:-D/8

C:-4D

D:-8D

Correct Answer:- Option-A

Question18:-Drag is the force exerted by the

A:-Solid on the fluid in the opposite direction of flow

B:-Fluid on the solid in the opposite direction of flow

C:-Fluid on the solid in the direction of flow

D:-Solid on the fluid in the direction of flow

Correct Answer:- Option-C

Question19:-Viscosity increases with stress over time for

A:-Thixotropic fluid

B:-Rheopectic fluid

C:-Bingham plastic

D:-Newtonian fluid

Correct Answer:- Option-B

Question20:-Pressure drop across the fluidized bed with increase in expansion of the bed

A:-Increases

B:-Decreases

C:-First increases and then decreases

D:-Remains constant

Correct Answer:- Option-D

Question21:-In a Tylor standard screen series, the ratio of the area of the openings in any screen to that of the next smaller screen is

A:-1.41

B:-1.65

C:-1.73

D:-2

Correct Answer:- Option-A

Question22:-Crushing of sticky clay is done by

A:-Ball mill

B:-Jaw crusher

C:-Hammer mills

D:-Fluid energy mill

Correct Answer:- Option-C

Question23:-For marine impeller, the flow number may be considered constant and equal to

A:-2100

B:-0.5

C:-4000

D:-0.97

Correct Answer:- Option-B

Question24:-The McCabe Δ L Law states that the

A:-The linear crystal growth rate does not depends on the crystal size

B:-The linear crystal growth rate depends on the crystal size

C:-Theoretical growth rate proportional to area

D:-Imperfections in the crystal size

Correct Answer:- Option-A

Question25:-In a rotary drum filter, the filtration rate

A:-Remains unaffected with change in drum speed

B:-Increases with increases in speed

C:-Decreases with increase in drum speed

D:-Increases linearly with increase in drum speed

Correct Answer:- Option-B

Question26:-A cyclone separator collection efficiency is a function of

A:-Particle size distribution of the feed

B:-Average particle size

C:-Increased centrifugal action

D:-Decreased centrifugal action

Correct Answer:- Option-A

Question27:-Mass flow bins has the characteristics of

A:-Density can vary

B:-Product can remain in dead zones until complete cleanout of the system

C:-Flow is erratic

D:-Flow is uniform

Correct Answer:- Option-D

Question28:-Used to enlarge the storage bin opening and cause flow by breaking up material bridges are known as

A:-Feeders

B:-Belt feeders

C:-Apron feeders

D:-Vibrating hoppers

Correct Answer:- Option-D

Question29:-As the distance between the heat source and the object receiving the heat increases, the rate of heat transfer by radiation

A:-Increases

B:-Increases linearly

C:-Decreases

D:-Remains constant

Correct Answer:- Option-C

Question30:-Calculate the rate of heat transfer per unit area through a copper plate 45 mm thick whose one face is maintained at 350°C and the other face at 50°C. Take thermal conductivity of copper as 370 W/m°C.

A:-0.455 MW/m^2

B:-0.566 MW/m^2

C:-2.466 MW/m^2

D:-3.466 MW/m^2

Correct Answer:- Option-C

Question31:-The colburn j factor for heat transfer is defined as

A:-$N_{st}N_{Pr}$

B:-$N_{st}N_{Pr}^{1/3}$

C:-$N_{st}N_{Pr}^{2/3}$

D:-$N_{st}N_{Pr}^{3/2}$

Correct Answer:- Option-C

Question32:-Peclet number is defined as

A:-Ratio between rate of heat transfer by convection to rate of heat transfer by bulk flow

B:-Ratio between rate of heat transfer by bulk flow to rate of heat transfer by convection

C:-Ratio between rate of heat transfer by bulk flow to rate of heat transfer by conduction

D:-Ratio between momentum diffusivity to thermal diffusivity

Correct Answer:- Option-C

Question33:-For the nucleate boiling on a vertical flat plate, Jacob correlation is given as

A:-$Nu = 0.16(Gr.Pr)^{0.25}$

B:-$Nu = 0.26(Gr.Pr)^{0.25}$

C:- $Nu = 0.16(PePr)^{0.25}$

D:- $Nu = 0.61(GrPr)^{0.25}$

Correct Answer:- Option-D

Question34:-Film wise condensation

A:-is characterized by a thin liquid film forming over the entire surface

B:-is less common than drop wise condensation

C:-occurs on non wettable surfaces

D:-is charaterized by high heat transfer coefficients than that for drop wise condensation

Correct Answer:- Option-A

Question35:-Assuming the sun to be a black body emitting radiation with maximum intensity at $\lambda = 289\mu m$, what is the surface temperature of the sun?

A:-20.09K

B:-10.02K

C:-273K

D:-303K

Correct Answer:- Option-B

Question36:-A cold fluid is heated from 40°C to 130°C by steam at 150°C. The LMTD in parallel flow is

A:-Lower than the LMTD in counter flow

B:-Greater than the LMTD in counter flow

C:-Equal to the LMTD in counter flow

D:-Zero

Correct Answer:- Option-C

Question37:-The tube side heat transfer coefficient just at the entrance of tube is

A:-one

B:-zero

C:-infinity

D:-same as the average value of heat transfer coefficient for tube side

Correct Answer:- Option-C

Question38:-The steam economy of an evaporator is defined as

A:-the number of kilograms of steam consumed per hour

B:-the number of kilograms of steam consumed per kilogram of solvent vaporized

C:-the number of kilograms of solvent vapourized per hour

D:-the number of kilograms of solvent vaporized per kilogram of steam fed to the evaporator

Correct Answer:- Option-D

Question39:-The rate of diffusion in gases is about

A:-$1\times10^{-7}m/\min$

B:-$1\times10^{-1}m/\min$

C:-$1\times10^{-14}m/\min$

D:-$1\times10^{-2}m/\min$

Correct Answer:- Option-B

Question40:-Which one of the following is not associated with absorption columns?

A:-Cavitation

B:-Channeling

C:-Flooding

D:-Scrubbing

Correct Answer:- Option-A

Question41:-A plot of partial pressure of the absorbed gas against temperature at various constant volume is known as

A:-Polytherm

B:-Adsorption isobar

C:-Adsorption isostere

D:-None of the above

Correct Answer:- Option-C

Question42:-Pick out the correct statement:

A:-Fenske equation is used to calculate the minimum reflux ratio in distillation

B:-Fenske equation is used to calculate the optimum reflux ratioin distillation

C:-Fenske equation is used to calculate the minimum number of plates for constant relative volatility

D:-Fenske equation is used to calculate the minimum number of plates for multi component distillation

Correct Answer:- Option-C

Question43:-When the Lewis number is equal to 1

A:-Humid heat is almost equal to the specific heat

B:-Concentration boundary layer is present above the thermal boundary layer

C:-Psychrometric line is present above that of the adiabatic saturation line

D:-Psychromatic line is present below the adiabatic saturation line

Correct Answer:- Option-A

Question44:-In Liquid-Liquid extractors, the interface is set in an open section

A:-at the middle of the extractor

B:-at the top or bottom of the extractor

C:-at the inlet of dispersed phase

D:-at the inlet of the continuous phase

Correct Answer:- Option-B

Question45:-Removal of one element from a solid alloy is known as

A:-Selective leaching

B:-Adsorption

C:-Absorption

D:-Humidification

Correct Answer:- Option-A

Question46:-Which of the following terminology correspond to Freeze drying?

A:-Lyophilization

B:-Salt solution

C:-Short drying time

D:-Operates at high pressure

Correct Answer:- Option-A

Question47:-The point where the falling rate drying curve intercepts the x-axis corresponds to

A:-Unbound moisture

B:-Equilibrium moisture

C:-Free moisture

D:-Critical moisture

Correct Answer:- Option-B

Question48:-In a McCabe-Thiele diagram of a binary distillation, the q-line for a feed of Saturated Vapour

A:-will be a vertical line

B:-will be a horizontal line

C:-have slope infinity

D:-have slope positive

Correct Answer:- Option-B

Question49:-Volume of the reactor corresponding to 100% conversion is

A:-100 litres

B:-50 litres

C:-10 litres

D:-Infinity

Correct Answer:- Option-D

Question50:-For the reactions requiring large residence time, which one of the following reactors is perferred?

A:-Continuous Stirred Reactor (CSTR)

B:-Plug Flow Reactors (PFR)

C:-Tubular reactors

D:-Combinations of CSTR and PFR

Correct Answer:- Option-A

Question51:-Example for solid-solid reaction

A:-Coal

B:-Iron

C:-Glass

D:-Silver

Correct Answer:- Option-C

Question52:-Pick out the wrong statement from the following:

A:-Batch reactors operates under steady state

B:-Batch reactors have back mixing

C:-Batch reactors operates under unsteady state

D:-Batch reactors are used in pharmaceutical industries

Correct Answer:- Option-A

Question53:-In a plug flow reactor, under what condition, ideal plug flow will be observed?

A:-Reynolds number = 2100

B:-Reynolds number < 2100

C:-Reynolds number infinity

D:-Reynolds number zero

Correct Answer:- Option-C

Question54:-K_M in Michaelis-Menten equation is

A:-Bimolecular association rate constant of enzyme-substrate binding

B:-Substrate concentration at which the reaction velocity is half of the maximum reaction velocity

C:-Unimolecular rate constant of the enzyme-substrate complex dissociating to enzyme and substrate

D:-Unimolecular rate constant of the enzyme-substrate complex dissociating to enzyme and product

Correct Answer:- Option-B

Question55:-When $[S] = 5K_M$, the ratio of V_0/V_{max}

A:-10/11

B:-1/2

C:-5/6

D:-11/10

Correct Answer:- Option-C

Question56:-If the residence time obtained for a reactor by the RTD experiment is less than that expected, it indicates

A:-Combination of PFR and CSTR

B:-CSTR

C:-PFR

D:-Presence of dead volume

Correct Answer:- Option-D

Question57:-One parameter in non-ideal PFR is

A:-Number of ideal tanks

B:-Dispersion co-efficient

C:-Residence time

D:-None of the above

Correct Answer:- Option-B

Question58:-For tanks in series model, the spread of the trace curve is α to

A:-Cube of the distance from the tracer origin

B:-Square of the distance from the tracer origin

C:-1/square of the distance from the tractor origin

D:-Square root of the distance from the tracer origin

Correct Answer:- Option-D

Question59:-Introduction of an integral action in the forward path of a unity feedback system results in a

A:-marginally stable system

B:-system with no steady state error

C:-system with reduced noise immunity

D:-system with better speed of response

Correct Answer:- Option-B

Question60:-Identify the correct statement from the following:

A:-Absolute humidity is expressed in percentage

B:-Warm air possesses less water vapor than cold air

C:-The higher the amount of water vapour, the higher the absolute humidity

D:-Saturated air has an absolute humidity of 100%

Correct Answer:- Option-C

Question61:-In measurement systems, which of the following are undesirable static characteristics:

A:-Drift, static error and dead zone

B:-Reproducibility and non-linearity

C:-Sensitivity and accuracy

D:-Drift, Static error, dead zone and non-linearity

Correct Answer:- Option-D

Question62:-The primary controller in a cascade control system must always be tuned:

A:-faster than the secondary

B:-using the Ziegler-Nichols method

C:-with greater filtering than the secondary

D:-after the secondary is tuned

Correct Answer:- Option-D

Question63:-What is the relation between bar and psi?

A:-1 bar = 1 psi

B:-1 bar = 201 psi

C:-1 bar = 20 psi

D:-1 bar = 14.5 psi

Correct Answer:- Option-D

Question64:-Phase lag of the frequency response of a second order system to a sinusoidal forcing function

A:-approaches 180° asymptotically

B:-is 120°

C:-is 30°

D:-is 90°

Correct Answer:- Option-A

Question65:-Which of the following is not an advantage of laminar flow burner used in flame photometry?

A:-Stable flame for analysis

B:-Noiseless

C:-Sample containing two or more solvents can be burned efficiently

D:-Efficient atomization of sample

Correct Answer:- Option-C

Question66:-The temperature of tempering oil baths maintained at 400°C during heat treatment of steel is measured by a/an _____ thermocouple.

A:-Iron-constantan

B:-Chromel-alumel

C:-Platinum-Platinum/Rhodium

D:-None of these

Correct Answer:- Option-A

Question67:-Cavitation in a control valve is caused by

A:-a laminar flow regime

B:-vibration in the packing

C:-the Von Karman effect

D:-pressure recovery

Correct Answer:- Option-D

Question68:-In a feed-back control system G and H denote open loop and close loop transfer functions respectively. The output-input relationship is

A:-H / (1 + G)

B:-G / (1 + H)

C:-G / H

D:-H / G

Correct Answer:- Option-A

Question69:-Aerobic process of water treatment

A:-produces more sludge than anaerobic process

B:-produces less sludge than anaerobic process

C:-produces same amount of sludge as anaerobic process

D:-produces no sludge

Correct Answer:- Option-A

Question70:-The power development by a hydro plant is directly proportional to

A:-head of dam

B:-discharge of water

C:-product of discharge and head of water

D:-none of the above

Correct Answer:- Option-C

Question71:-Which type of fire extinguisher must not be used in case of electrical base fire?

A:-Halon extinguisher

B:-Carbon chloride extinguisher

C:-Foam extinguisher

D:-Dry power extinguisher

Correct Answer:- Option-C

Question72:-Match the following:

	List I		List II
a.	R.D.X.	i.	Cyclotetramethylene tetranitraamine
b.	P.E.T.N.	ii.	2, 4, 6 Trinitrotoluene
c.	H.M.X.	iii.	Pentaerythritol teranitrate

d. T.N.T.   iv. Cyclotrimethlene trinitra amine

a   b   c   d
    A:-i   ii   iii   iv
    B:-ii   iii   iv   i
    C:-iv   i   ii   iii
    D:-iv   iii   i   ii
    Correct Answer:- Option-D

Question73:-High COD to BOD ratio of an organic pollutant represents:
    A:-Presence of free oxygen for the aerobic decomposition
    B:-high biodegradability of the pollutant
    C:-presence of toxic material in the pollutant
    D:-low biodegradability of the pollutant
    Correct Answer:- Option-D

Question74:-By using combined cycle steam and gas power plant
    A:-specific fuel consumption can be decreased
    B:-efficiency increased
    C:-Specific fuel consumption can be decreased and efficiency increased
    D:-None of the mentioned above
    Correct Answer:- Option-C

Question75:-In fault tree analysis, event symbols describe the events that lead to
    A:-Subsystem level failure
    B:-Parts level failure
    C:-System level failure
    D:-Component level failure
    Correct Answer:- Option-C

Question76:-The plume behavior which occurs in the super adiabatic condition with light to moderate wind speed in the presence of large-scale thermal eddies are known as
    A:-Coning Plume
    B:-Looping Plume
    C:-Neutral Plume
    D:-Fanning Plume
    Correct Answer:- Option-B

Question77:-The operating temperature of a central receiver power tower of solar plant is
    A:-100°C - 200°C

B:-5000°C - 10000°C

C:-1000°C - 5000°C

D:-500°C - 1000°C

Correct Answer:- Option-D

Question78:-If you bypass an emergency shutdown (ESD) function for preventive maintenance but have not properly defined mitigations, you have

A:-Weakened the hardware barrier

B:-Removed a hardware barrier

C:-Removed a human barrier

D:-None of the above

Correct Answer:- Option-B

Question79:-At point where dissolved oxygen is minimum

A:-Rate of reaeration equals rate of deoxygenation

B:-Rate of reaeration exceeds rate of deoxygenation

C:-Rate of deoxygenation exceeds rate of reaertion

D:-Rate of reaeration equals two times rate of deoxygenation

Correct Answer:- Option-A

Question80:-What is downwind turbine?

A:-Rotor is positioned at the three-quarters of the height of the tower

B:-Rotor of the turbine is in front of the unit

C:-Rotor is positioned at the bottom of the tower

D:-Rotor of the turbine is behind the unit

Correct Answer:- Option-D

Question81:-The type of polymerisation involved in the formation of Nylon-6 is

A:-Ring opening polymerisation

B:-Condensation Polymerisation

C:-Addition Polymerisation

D:-None of the above

Correct Answer:- Option-A

Question82:-Mostly Sulphuric Acid is manufactured by

A:-Girbatol process

B:-Frasch process

C:-Electric process

D:-Double contact double absorption process

Correct Answer:- Option-D

Question83:-Undesirable side reaction occured during the manufacture of Urea is

A:-Formation of $NH_4.COO.NH_2$

B:-Formation of $NH_2.CO.NH_2$

C:-Formation of $NH_2.CO.NH.CO.NH_2$

D:-None of the above

Correct Answer:- Option-C

Question84:-Strength of sugar solutions are expressed in

A:-^0API

B:-$^0Twaddell$

C:-^0Brix

D:-^0Baume

Correct Answer:- Option-C

Question85:-In petroleum refinery operations, _____ process is used for converting paraffins and naphthenes to aromatics.

A:-Isomerisation

B:-Hydrocracking

C:-Catalytic reforming

D:-Alkylation

Correct Answer:- Option-C

Question86:-Select the correct combination that correctly matches the process in group 1 with the entries in group 2:

Group 1		Group 2	
P.	Electric Process	I.	Pulp production
Q.	Sulphite Process	II.	Phosphorus production
R.	Solvay Process	III.	Sulpher Mining
S.	Frasch Process	IV.	Soda ash

A:-P - III, Q - IV, R - II, S - I

B:-P - IV, Q - II, R - III, S - I

C:-P - II, Q - I, R - IV, S - III

D:-P - I, Q - IV, R - III, S - II

Correct Answer:- Option-C

Question87:-Polyvinyl chloride is prepared by

A:-Addition type kinetics

B:-Condensation polymerisation

C:-Reacting hydrochloric acid with polyethylene

D:-Reacting chlorine with polyethylene

Correct Answer:- Option-A

Question88:-Catalitic cracking is a

A:-Hydrogen addition process

B:-Breaking down of higher molecular weight componds to lower molecular weight compounds with endothermic reaction

C:-Breaking down of higher molecular weight componds to lower molecular weight compounds with exothermic reaction

D:-A coking process

Correct Answer:- Option-C

Question89:-Tripple superphosphate is prepared by the reaction of

A:-Phosphate rock with sulphuric acid

B:-Phosphate rock with phosphoric acid

C:-Phosphate rock with sulpher

D:-None of the above

Correct Answer:- Option-B

Question90:-In India which one of the industries produce elemental sulpher as a by product?

A:-Petroleum refineries

B:-Paper and pulp industries

C:-Coal mining plants

D:-Sulphuric acid plants

Correct Answer:- Option-A

Question91:-If the interest rate is 12% and the compounding is done at the end of every two months, the effective rate of return will be

A:-$(1+0.12)^6 - 1$

B:-$\left[1+\left(0.12/6\right)\right]^6 - 1$

C:-$\left[1+\left(0.12/2\right)\right]^6 - 1$

D:-$(1+0.12)^{12} - 1$

Correct Answer:- Option-B

Question92:-Allocation of depreciation is uniform in

A:-Straight line method

B:-Sinking fund method

C:-Declining balance method

D:-Units of producing method

Correct Answer:- Option-A

Question93:-Quick ratio is defined as

A:-Liquid Assets / Current liabilities

B:-Current Assets / Current liabilities

C:-Working Assets / Current assets

D:-Liquid Assets / Total investment

Correct Answer:- Option-A

Question94:-At discounted cashflow rate of return

A:-Net Present Value = 0

B:-Net Present Value > 0

C:-Net Present Value < 0

D:-Can't Predict

Correct Answer:- Option-A

Question95:-If the investment at zero time is 10 lakhs and annual cash flow is Rs. 2,50,000, the payback period will be

A:-2 years

B:-2.5 years

C:-4 years

D:-3 years

Correct Answer:- Option-C

Question96:-At break even point

A:-Cash flow is zero

B:-Sales venue is zero

C:-Total cost is zero

D:-Gross Profit is zero

Correct Answer:- Option-D

Question97:-If the cost of a 100 MT chemical plant is 50 lakhs in the year 2005, what is the cost of a 200 MT plant in the year 2010? Assume that the cost index in 2005 and 2010 were 450 and 540 respectively.

A:-90 lakhs

B:-120 lakhs

C:-60 lakhs

D:-100 lakhs

Correct Answer:- Option-A

Question98:-Which of the following is not correct?

A:-CPM uses deterministic model

B:-PERT uses probabilistic model

C:-CPM is used for projects that require research and development

D:-PERT is an event oriented technique

Correct Answer:- Option-C

Question99:-Which one of the following is not a current asset?

A:-Cash in hand

B:-Machinery

C:-Sundry debtors

D:-Bills receivable

Correct Answer:- Option-B

Question100:-Which one of the following is correct?

A:-Creditor is a person who owes money to the business

B:-Sundry debtor is a liability

C:-Closing stock will not appear in trial balance

D:-Secured loan is not a liability

Correct Answer:- Option-C