Kerala Public Enterprises (Selection and Recruitment)Board
Opposite KELTRON, Vellayambalam, Thiruvananthapuram
Website: kpesrb.kerala.gov.in, Email: kpesrb@gmail.com
Tel: 0471 - 2995042

Version: A **Question Booklet No:** 09725

Name of Examination: Junior Operator **Date:** 11/10/2026

Written examination for:

(1) 097/2025, Junior Operator, Kerala Minerals and Metals Limited -T P Unit

Instructions to Candidates:

1. Candidate should not start writing answers until the indication is given to start answering.
2. The question paper contains 100 questions. Each question is provided with four choices (A), (B), (C) and (D) having one correct answer. Choose the correct answer and darken the Bubble corresponding to the question number using Blue or Black ball point pen in the OMR Sheet.
3. Each correct answer carries 1 mark. There will be no negative mark for wrong answers or unattended questions.
4. Do not write anything else on the question paper. Sheet for rough work is appended to the question paper in the end.
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Total number of questions: **100** Maximum marks: **100** Time: **90 Minutes**

KERALA PUBLIC ENTERPRISES SELECTION & RECRUITMENT BOARD

1	The Acronym “PASS” used for fire extinguisher operation stands for			
	(A)	Pickup, Aim, Squeeze, Squirt	(B)	Push, Alarm, Swirl, Sweep
	(C)	Pull, Aim, Squeeze, Sweep	(D)	Pull, Aim, Swirl, Swat
2	BLEVE stands for			
	(A)	Boiling Liquid Expanding Vapour Explosion	(B)	Burning Liquid Expansion Vessel event
	(C)	Boiling Level Energy Vent Explosion	(D)	Basic Liquid Evaporation Vapour Event

3	Which of the following has zero dipole moment			
	(A)	Ammonia	(B)	Water
	(C)	Carbon tetrachloride	(D)	Ortho-Dichlorobenzene
4	Hydrometer is used to measure			
	(A)	Specific gravity of liquids	(B)	Humidity
	(C)	Water content of a solution	(D)	Conductivity of a liquid
5	Flow transmitters typically output which standard signal			
	(A)	0-10 V DC	(B)	0-5 psi
	(C)	4-20 mA	(D)	Digital pulse
6	The half-life period of a first order reaction is 10 min. What % of reactant remains after 1 hour			
	(A)	60.0	(B)	40.0
	(C)	3.12	(D)	1.56
7	The level of a liquid under pressure can be determined using			
	(A)	Bubbler system	(B)	Differential pressure manometer
	(C)	Diaphragm box system	(D)	Air trap system
8	A screw compressor belongs to the positive displacement compressor type. The other name for the screw compressor is			
	(A)	Reciprocating compressor	(B)	Centrifugal compressor
	(C)	Helical axial compressor	(D)	Helical rotary compressor
9	Heat exchangers are used in			
	(A)	Radiators in automobile	(B)	Intercoolers and preheaters
	(C)	Condensers and boilers in steam plants	(D)	All of these
10	Diffusion is a process of			

	(A)	Movement of particles from higher concentration to lower concentration	(B)	Movement of particles through semipermeable membrane
	(C)	Rarefaction of particle	(D)	Accumulation of particles on a solid surface

11	The stability of carbanions is in the order			
	(A)	$1^o>2^o>3^o$	(B)	$3^o>2^o>1^o$
	(C)	$2^o>3^o>1^o$	(D)	$2^o>1^o>3^o$

12	The number of possible chain isomers of pentane is			
	(A)	2	(B)	3
	(C)	4	(D)	5

13	Which act primarily regulates water pollution from industrial effluents in India			
	(A)	Air Act 1981	(B)	Water Act 1974
	(C)	Factories Act 1948	(D)	Environment Protection Act 1986

14	The rate of chemical reaction can be expressed as			
	(A)	The rate of disappearance of the reactants	(B)	The rate of formation of the product of the reaction
	(C)	Neither A nor B	(D)	Both A and B

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15	1 gm mole of methane contains			
	(A)	$6.02x10^{23}$ atoms of hydrogen	(B)	4 gm atom of hydrogen
	(C)	$3.01x10^{23}$ molecules of methane	(D)	3 gm of carbon

16	1000 kg of wet solids are to be dried from 60 to 20 % moisture (by weight). The mass of moisture removed in kg is			
	(A)	520	(B)	200
	(C)	400	(D)	500

17	Saponification is the process in which

	(A)	Fats are hydrogenated to form saturated fats	(B)	Fats and oils react with alkali to produce soap and glycerol
	(C)	Glycerol is oxidised to fatty acids	(D)	Fatty acids are esterified with alchohol

18	Which of the following isotherms deals with multilayer absorption			
	(A)	Langmuir	(B)	Freundlich
	(C)	BET	(D)	Gibbs

19	Experimental evidence for wave nature of electrons results from			
	(A)	Plank's experiment	(B)	de Broglie's experiment
	(C)	Davison and Germer experiment	(D)	Rutherford's experiment

20	Identify the control measure that is most effective for reducing exposure at the source			
	(A)	PPE	(B)	Elimination
	(C)	Training	(D)	Warning signs

21	The Haber-Bosch ammonia synthesis process uses an iron catalyst with K_2O/Al_2O_3 promoters. The catalyst used is			
	(A)	Homogeneous catalyst	(B)	Heterogeneous catalyst
	(C)	Neither Homogeneous nor Heterogeneous	(D)	Both Homogeneous and Heterogeneous

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22	A thremodynamic system is separated from the surroundings by			
	(A)	Heat	(B)	Work
	(C)	Boundary	(D)	Process

23	Which of the following is not a method of extinguishing fire			
	(A)	Starvation	(B)	Smothering
	(C)	Cooling	(D)	Darkening

24	Windrow is a method of solid waste disposal by

	(A)	Sanitary land fill	(B)	Composting
	(C)	Incineration	(D)	None of these

25	A catalyst is used			
	(A)	Only for increasing the velocity of a reaction	(B)	For altering the velocity of a reaction
	(C)	Only for decreasing the velocity of a reaction	(D)	All of above

26	The technique used for separation of ortho and para nitrophenols is			
	(A)	Sublimation	(B)	Distillation
	(C)	Crystallization	(D)	Steam distillation

27	Which of the following nuclei is not commonly observed in NMR spectroscopy because it has a nuclear spin quantum number (I=0)?			
	(A)	^{1}H	(B)	^{13}C
	(C)	^{12}C	(D)	^{19}F

28	Gabriel phthalimide reaction is used for the synthesis of			
	(A)	Amines	(B)	Amides
	(C)	Imides	(D)	None of these

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29	Which among the following does not give Cannizzaro reaction			
	(A)	Benzaldehyde	(B)	Acetaldehyde
	(C)	Salicylaldehyde	(D)	Formaldehyde

30	Oil and grease present in an emulsified state in waste water discharged from industries can be removed by			
	(A)	Biological oxidation	(B)	skimming off
	(C)	Chemical coagulation	(D)	Chlorination

31	The rate constant of a reaction depends on

	(A)	Temperature	(B)	Mass
	(C)	Weight	(D)	Time

32	Which of the following is a pseudohalide?			
	(A)	ICl^-	(B)	CN^-
	(C)	IF_5	(D)	I_3^-

33	The Mollier chart is a plot of			
	(A)	Pressure Versus enthalpy	(B)	Temperature versus entropy
	(C)	Enthalpy versus entropy	(D)	Enthalpy versus temperature

34	The Nusselt number (Nu) represents			
	(A)	Ratio of conductive to convective heat transfer	(B)	Ratio of convective to conductive heat transfer
	(C)	Ratio of Reynolds number to Prandtl number	(D)	Ratio of Prandtl number to Reynolds number

35	Ethanol water system forms an azeotrope at composition of 96.5% of ethanol. The realtive volatility of the mixture at this composition is			
	(A)	1	(B)	<1
	(C)	∞	(D)	0

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36	The primary purpose of extended surfaces on a heat transfer is to			
	(A)	Block radiation	(B)	Reduce convection
	(C)	Decrease conduction	(D)	Increase the surface area for convection

37	Reimer-Tiemann reaction is carried out on			
	(A)	Benzoic acids	(B)	Phenols
	(C)	Aromatic aldehydes	(D)	Aromatic carboxylic acids

38	The symmetry element not possessed by chloroform is

	(A)	C_1	(B)	C_2
	(C)	C_3	(D)	Plane of symmetry

39	A terminal acetylenic group can be converted to an acetyl ($CH_3C=O$) group by treatment with .....in acid medium			
	(A)	$HgSO_4$	(B)	Ag_2CO_3
	(C)	$MgSO_4$	(D)	$CaCO_3$

40	The major limitation of the first law of thermodynamics is that it does not consider			
	(A)	Heat as a form of energy	(B)	Rate of change of a process
	(C)	Direction of change	(D)	Spontaneous processes

41	Heat is transferred from an electric bulb by			
	(A)	Conduction	(B)	Convection
	(C)	Radiation	(D)	All of these

42	Flash distillation is			
	(A)	same as differential distillation	(B)	Used for multicomponent systems like crude refining
	(C)	same as simple distillation	(D)	Most useful in handling binary systems

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43	Identify the ASME section that covers process piping			
	(A)	ASME B31.3	(B)	SME Section VIII Div I
	(C)	ASME Section 1	(D)	ASME B16.5

44	Cavitation in centrifugal pumps occurs when the pressure at the impeller eye			
	(A)	Drops below the fluid vapour pressure	(B)	Drops below the atmospheric pressure
	(C)	Drops below the pump design pressure	(D)	Drops below the operating pressure

45	With an increase in pressure, the latent heat of vaporization of a liquid

	(A)	Increases	(B)	Decreases
	(C)	Remains constant	(D)	Spontaneously drops to zero

46	A reactor is fed with 100 kmol of SO_2 and 100 kmol of O_2 to produce SO_3. The rpduct stream contains 50 kmol SO_3. The percentage conversion of SO_2 is			
	(A)	25%	(B)	50%
	(C)	75%	(D)	100%

47	Fructose gives a positive Tollen's test because			
	(A)	It contains an aldehyde group	(B)	It is oxidised directly without structural change
	(C)	It undergoes keto-enol tautomerism in alkaline medium to form aldoses	(D)	It contains two carbonyl groups

48	A reaction showed a 10-fold increase in rate constant when the temperature was raised from 400 K to 500K. The activation energy of the reaction is approximately			
	(A)	400 kJ	(B)	100kJ
	(C)	40kJ	(D)	25kJ

49	The osmotic pressure (π) of a polymer solution was determined at different concentration (c). π /c was plotted against c and its limiting value corresponding to c tending to zero was 18.6 mm water $dm^3 g^{-1}$. The molar mass of the polymer in kg mol^{-1} is			
	(A)	150	(B)	100
	(C)	50	(D)	10

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50	The losses for flow through valves and fitting are expressed in terms of			
	(A)	drag coefficient	(B)	equivalent length of a straight pipe
	(C)	Shape factor	(D)	roughness factor

51	In the production of sulphur trioxide 100 kmol of SO_2 and 200 kmol of O_2 are fed to a reactor. The product stream is found to contain 80 kmol SO_3. What is the percentage conversion of SO_2

	(A)	20	(B)	80
	(C)	40	(D)	60

52	Heat -sensitive materials can be dried using			
	(A)	Indirect drying	(B)	Freeze drying
	(C)	Spray drying	(D)	None of these

53	Identify the instrument that can be used for measuring point velocity			
	(A)	pitot tube	(B)	Orifice meter
	(C)	Rotameter	(D)	Venturi meter

54	For a hydraulically smooth pipe, the friction factor for turbulent flow			
	(A)	Depends only on the Reynolds number	(B)	Depends only on relative roughness
	(C)	Do not depend on the Reynolds number	(D)	Is a constant

55	Cement mainly contains			
	(A)	CaO, SiO_2, Al_2O_3	(B)	MgO, SiO_2, K_2O
	(C)	Al_2O_3,MgO, Fe_2O_3	(D)	CaO,MgO,K_2O

56	Sweeting of petroleum prodct means the removal of			
	(A)	Sulphur and its compounds	(B)	Water
	(C)	Organic impurities	(D)	Wax

57	The vapour pressure of a liquid at 100 K is 2.0 Torr. The temperature at which vapour pressure becomes 4 Torr is : (given enthalpy of vaporisation 230 R, where R is gas constant			
	(A)	143 K	(B)	201 K
	(C)	303 K	(D)	402 K

58	Unimolecular gas phase surface catalysed reactions follow

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	(A)	first order kinetics at all pressures	(B)	first order kinetics at low pressures and zero order kinetics at higher pressures
	(C)	Zero order kinetics at low pressure and first order kinetics at high pressures	(D)	Zero order kinetics at all pressures

59	Among the following compounds which one undergoes Schottky defect			
	(A)	Silver bromide	(B)	Sodium chloride
	(C)	Zinc oxide	(D)	Sulphide

60	The following type of bonding is strongly directional in solids			
	(A)	Metallic bonding	(B)	Ionic bonding
	(C)	Covalent bonding	(D)	Van der Waal's bonding

61	The main constitutents of Portland cement are calcium aluminate and			
	(A)	Aluminium silicate	(B)	Sodium silicate
	(C)	Carbonates	(D)	Calcium silicate

62	In an acid buffer solution, if some $H_2 SO_4$ is added, its pH will			
	(A)	Remains constant	(B)	Change but cannot be predicted
	(C)	Decrease	(D)	Increase

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63	Bohr’s atomic model can explain			
	(A)	The spectrum of hydrogen atom only	(B)	The spectrum of an atom or ion containing one electron only
	(C)	The spectrum of hydrogen molecule	(D)	The solar spectrum

64	The Fourdrinier machine is used in the manufacture of			
	(A)	Sugar	(B)	Paper
	(C)	Alcohol from molasses	(D)	Antibiotics

65	The process used to improve the flow properties of fuel oil in a refinery is called

	(A)	visbreaking	(B)	Hydrocracking
	(C)	Steam reforming	(D)	Alkylation

66	The flash point of a fuel indicates its			
	(A)	Cetane number	(B)	Energy content
	(C)	Grade of fuel	(D)	Flammability hazard

67	ZnO is an example for			
	(A)	n type semiconductor	(B)	p type semiconductor
	(C)	insulator	(D)	superconductor

68	Packing efficiency (%) of fcc crystal is			
	(A)	53.3	(B)	68
	(C)	74.0	(D)	100

69	Amount of Cu (in mg) deposited by passing 20 mA of current through aq. Copper sulphate solution for 10 minutes			
	(A)	96.5	(B)	3.92
	(C)	3.15	(D)	63.5

70	Main pollutant present in the automobile exhaust is			
	(A)	CO	(B)	CO_2
	(C)	NO	(D)	Hydrocarbons

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71	Concentration of solids in the boiler drum is controlled by			
	(A)	Condensate recovery	(B)	Reducing dosage of chemicals
	(C)	Steam venting	(D)	Blow down

72	Which type of water pollutant is most directly responsible for causing eutrophication in lakes and rivers

	(A)	Excess nutrients	(B)	Suspended solids
	(C)	Oil spills	(D)	Thermal pollution from discharging hot water

73	Which parameter is most critical to control in boiler feedwater to minimize scale formation			
	(A)	silica concentration	(B)	feedwater temperature
	(C)	Dissolved oxygen concentration	(D)	Total dissolved solids (TDS) and hardness

74	The orbital angular momentum of an electron in 2s orbital is			
	(A)	$-\sqrt{2}\ h/2\pi$	(B)	$h/4\pi$
	(C)	$h/2\pi$	(D)	Zero

75	Element that shows both +3 and +4 oxidation state is			
	(A)	Holmium	(B)	Cerium
	(C)	Promethium	(D)	Gadolinium

76	Hydrogen bonds are strongest in			
	(A)	O _____ H - - - S	(B)	S _____ H - - - O
	(C)	F _____ H - - - F	(D)	F _____ H - - - O

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77	Thermocouple should be checked periodically when used at elevated temperature due to			
	(A)	Resolution	(B)	Accuracy
	(C)	Drift	(D)	None of these

78	Hydrocracking employs			
	(A)	High pressure and temperature	(B)	Low pressure and temperature
	(C)	High pressure and low temperature	(D)	High temperature and low pressure

79	Purging operation is performed on recycle stream for

	(A)	Increasing yield	(B)	Reducing the accumulation of inerts
	(C)	Conserving heat	(D)	Improving efficiency

80	The number of unpaired electrons present in $K_3[Fe(CN)_6]$ is			
	(A)	0	(B)	3
	(C)	5	(D)	1

81	Which of the following cations is coloured in aqueous solution?			
	(A)	Cu^{+}	(B)	Ni^{2+}
	(C)	La^{3+}	(D)	Ti^{4+}

82	The strongest reducing ion among the following is			
	(A)	U^{3+}	(B)	Am^{3+}
	(C)	Sm^{3+}	(D)	Cr^{3+}

83	For a binary distillation column with a relative volatility a = 1.5 throughout the column, compared to a=2.0, the minimum number of theoretical stages required will be			
	(A)	Less	(B)	More
	(C)	same	(D)	Infinity

84	A supercritical fluid is characterised by			
	(A)	Gas-like viscosity and liquid like density	(B)	Only gas-like viscosity
	(C)	Only liquid like density	(D)	None of the above

85	The order of a reaction can be identified using			
	(A)	Experimental data	(B)	Balanced stoichiometric equation
	(C)	Activation energy	(D)	Molecularity of the reaction

86	Rubber latex is an example of _____ fluid

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	(A)	Dilatent	(B)	Newtonian
	(C)	Pseudoplastic	(D)	Bingham plastic

87	Ammonia is manufactured by			
	(A)	Frasch Process	(B)	Haber's Process
	(C)	Le-Blanc Process	(D)	Solvay Process

88	For a single step reaction X+2Y → Products, the molecularity is			
	(A)	Zero	(B)	2
	(C)	3	(D)	1

89	When starting a centrifugal pump, the delivery valve is kept			
	(A)	Fully open	(B)	Fully closed
	(C)	Half open	(D)	Less than half open

90	Solenoid valve works like			
	(A)	P controller	(B)	P-D controller
	(C)	P-I-D controller	(D)	On-off controller

91	Fcenter is a			
	(A)	cationic site	(B)	anionic site
	(C)	free electron	(D)	solvated electron

92	Which one of the following has largest band gap			
	(A)	Silicon	(B)	Germanium
	(C)	Tellurium	(D)	Diamond

93	If the values of the process variables associated with an operation do not change with time, then the operation is			
	(A)	Steady-state operation	(B)	Unsteady-state operation
	(C)	Cyclic operation	(D)	the process is not feasible

KERALA PUBLIC ENTERPRISES SELECTION & RECRUITMENT BOARD

94	Select a suitable instrument to measure the flow rate in an open channel			
	(A)	Magnetic flow meter	(B)	Venturi meter
	(C)	Orifice meter	(D)	Triangular notch
95	Liquified Petroleum Gas (LPG) is mainly a mixture of			
	(A)	Propane and Butane	(B)	Methane and Ethane
	(C)	Olefins and Naphthenes	(D)	Ethane and Pentane
96	In gas-solid chromatography(GSC) the basis of separation is			
	(A)	Partition	(B)	Absorption
	(C)	Adsorption	(D)	None of these
97	Which reagent should be used to produce predominantly the thermodynamic enolate from 2-methlycyclohexanone?			
	(A)	LDA/DME	(B)	Et_3N/DMF
	(C)	LDA/THF	(D)	Ph_3CLi/DME
98	The number of nodal planes in Px orbital is			
	(A)	3	(B)	2
	(C)	1	(D)	0
99	The complex species which exhibits Jahn-Teller distortion is			
	(A)	$[Mn(H_2O)_6]^{3+}$	(B)	$[Cr(H_2O)_6]^{3+}$
	(C)	$[Fe(CN)_6]^{4-}$	(D)	$[Mn(H_2O)_6]^{2+}$
100	The temperature inside a red hot furnace can be measured using			
	(A)	Mercury thermometer	(B)	Pyrometer
	(C)	Thermocouple	(D)	RTD

KERALA PUBLIC SERVICE COMMISSION
SELECTION & RECRUITMENT BOARD

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	(C)	Thermocouple	(D)	RTD
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18	For a binary distillation column with a relative volatility a = 1.5 throughout the column, compared to a=2.0, the minimum number of theoretical stages required will be			
	(A)	Less	(B)	More
	(C)	same	(D)	Infinity
19	The strongest reducing ion among the following is			
	(A)	U^{3+}	(B)	Am^{3+}
	(C)	Sm^{3+}	(D)	Cr^{3+}
20	Which of the following cations is coloured in aqueous solution?			
	(A)	Cu^{+}	(B)	Ni^{2+}
	(C)	La^{3+}	(D)	Ti^{4+}
21	The number of unpaired electrons present in $K_3[Fe(CN)_6]$ is			
	(A)	0	(B)	3
	(C)	5	(D)	1
22	Purging operation is performed on recycle stream for			
	(A)	Increasing yield	(B)	Reducing the accumulation of inerts
	(C)	Conserving heat	(D)	Improving efficiency
23	Hydrocracking employs			
	(A)	High pressure and temperature	(B)	Low pressure and temperature
	(C)	High pressure and low temperature	(D)	High temperature and low pressure
24	Thermocouple should be checked periodically when used at elevated temperature due to			
	(A)	Resolution	(B)	Accuracy
	(C)	Drift	(D)	None of these
25	Hydrogen bonds are strongest in			

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	(A)	O _____ H - - - S	(B)	S _____ H - - - O
	(C)	F _____ H - - - F	(D)	F _____ H - - - O

26	Element that shows both +3 and +4 oxidation state is			
	(A)	Holmium	(B)	Cerium
	(C)	Promethium	(D)	Gadolinium

27	The orbital angular momentum of an electron in 2s orbital is			
	(A)	$-\sqrt{2}\ h/2\pi$	(B)	$h/4\pi$
	(C)	$h/2\pi$	(D)	Zero

28	Which parameter is most critical to control in boiler feedwater to minimize scale formation			
	(A)	silica concentration	(B)	feedwater temperature
	(C)	Dissolved oxygen concentration	(D)	Total dissolved solids (TDS) and hardness

29	Which type of water pollutant is most directly responsible for causing eutrophication in lakes and rivers			
	(A)	Excess nutrients	(B)	Suspended solids
	(C)	Oil spills	(D)	Thermal pollution from discharging hot water

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30	Concentration of solids in the boiler drum is controlled by			
	(A)	Condensate recovery	(B)	Reducing dosage of chemicals
	(C)	Steam venting	(D)	Blow down

31	Main pollutant present in the automobile exhaust is			
	(A)	CO	(B)	CO_2
	(C)	NO	(D)	Hydrocarbons

32	Amount of Cu (in mg) deposited by passing 20 mA of current through aq. Copper sulphate solution for 10 minutes

	(A)	96.5	(B)	3.92
	(C)	3.15	(D)	63.5

33	Packing efficiency (%) of fcc crystal is			
	(A)	53.3	(B)	68
	(C)	74.0	(D)	100

34	ZnO is an example for			
	(A)	n type semiconductor	(B)	p type semiconductor
	(C)	insulator	(D)	superconductor

35	The flash point of a fuel indicates its			
	(A)	Cetane number	(B)	Energy content
	(C)	Grade of fuel	(D)	Flammability hazard

36	The process used to improve the flow properties of fuel oil in a refinery is called			
	(A)	visbreaking	(B)	Hydrocracking
	(C)	Steam reforming	(D)	Alkylation

37	The Fourdrinier machine is used in the manufacture of			
	(A)	Sugar	(B)	Paper
	(C)	Alcohol from molasses	(D)	Antibiotics

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38	Bohr's atomic model can explain			
	(A)	The spectrum of hydrogen atom only	(B)	The spectrum of an atom or ion containing one electron only
	(C)	The spectrum of hydrogen molecule	(D)	The solar spectrum

39	In an acid buffer solution, if some $H_2 SO_4$ is added, its pH will			
	(A)	Remains constant	(B)	Change but cannot be predicted
	(C)	Decrease	(D)	Increase

40	The main constitutents of Portland cement are calcium aluminate and			
	(A)	Aluminium silicate	(B)	Sodium silicate
	(C)	Carbonates	(D)	Calcium silicate
41	The following type of bonding is strongly directional in solids			
	(A)	Metallic bonding	(B)	Ionic bonding
	(C)	Covalent bonding	(D)	Van der Waal's bonding
42	Among the following compounds which one undergoes Schottky defect			
	(A)	Silver bromide	(B)	Sodium chloride
	(C)	Zinc oxide	(D)	Sulphide
43	Unimolecular gas phase surface catalysed reactions follow			
	(A)	first order kinetics at all pressures	(B)	first order kinetics at low pressures and zero order kinetics at higher pressures
	(C)	Zero order kinetics at low pressure and first order kinetics at high pressures	(D)	Zero order kinetics at all pressures
44	The vapour pressure of a liquid at 100 K is 2.0 Torr. The temperature at which vapour pressure becomes 4 Torr is : (given enthalpy of vaporisation 230 R, where R is gas constant			
	(A)	143 K	(B)	201 K
	(C)	303 K	(D)	402 K
45	Sweeting of petroleum prodct means the removal of			
	(A)	Sulphur and its compounds	(B)	Water
	(C)	Organic impurities	(D)	Wax
46	Cement mainly contains			

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	(A)	CaO, SiO_2, Al_2O_3	(B)	MgO, SiO_2, K_2O
	(C)	Al_2O_3,MgO, Fe_2O_3	(D)	CaO,MgO,K_2O

47	For a hydraulically smooth pipe, the friction factor for turbulent flow			
	(A)	Depends only on the Reynolds number	(B)	Depends only on relative roughness
	(C)	Do not depend on the Reynolds number	(D)	Is a constant

48	Identify the instrument that can be used for measuring point velocity			
	(A)	pitot tube	(B)	Orifice meter
	(C)	Rotameter	(D)	Venturi meter

49	Heat -sensitive materials can be dried using			
	(A)	Indirect drying	(B)	Freeze drying
	(C)	Spray drying	(D)	None of these

50	In the production of sulphur trioxide 100 kmol of SO_2 and 200 kmol of O_2 are fed to a reactor. The product stream is found to contain 80 kmol SO_3. What is the percentage conversion of SO_2			
	(A)	20	(B)	80
	(C)	40	(D)	60

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51	The losses for flow through valves and fitting are expressed in terms of			
	(A)	drag coefficient	(B)	equivalent length of a straight pipe
	(C)	Shape factor	(D)	roughness factor

52	The osmotic pressure (π) of a polymer solution was determined at different concentration (c). π /c was plotted against c and its limiting value corresponding to c tending to zero was 18.6 mm water $dm^3 g^{-1}$. The molar mass of the polymer in kg mol^{-1} is

	(A)	150	(B)	100
	(C)	50	(D)	10

53	A reaction showed a 10-fold increase in rate constant when the temperature was raised from 400 K to 500K. The activation energy of the reaction is approximately			
	(A)	400 kJ	(B)	100kJ
	(C)	40kJ	(D)	25kJ

54	Fructose gives a positive Tollen's test because			
	(A)	It contains an aldehyde group	(B)	It is oxidised directly without structural change
	(C)	It undergoes keto-enol tautomerism in alkaline medium to form aldoses	(D)	It contains two carbonyl groups

55	A reactor is fed with 100 kmol of SO_2 and 100 kmol of O_2 to produce SO_3. The rpduct stream contains 50 kmol SO_3. The percentage conversion of SO_2 is			
	(A)	25%	(B)	50%
	(C)	75%	(D)	100%

56	With an increase in pressure, the latent heat of vaporization of a liquid			
	(A)	Increases	(B)	Decreases
	(C)	Remains constant	(D)	Spontaneously drops to zero

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57	Cavitation in centrifugal pumps occurs when the pressure at the impeller eye			
	(A)	Drops below the fluid vapour pressure	(B)	Drops below the atmospheric pressure
	(C)	Drops below the pump design pressure	(D)	Drops below the operating pressure

58	Identify the ASME section that covers process piping			
	(A)	ASME B31.3	(B)	SME Section VIII Div I
	(C)	ASME Section 1	(D)	ASME B16.5

59	Flash distillation is			
	(A)	same as differential distillation	(B)	Used for multicomponent systems like crude refining
	(C)	same as simple distillation	(D)	Most useful in handling binary systems

60	Heat is transferred from an electric bulb by			
	(A)	Conduction	(B)	Convection
	(C)	Radiation	(D)	All of these

61	The major limitation of the first law of thermodynamics is that it does not consider			
	(A)	Heat as a form of energy	(B)	Rate of change of a process
	(C)	Direction of change	(D)	Spontaneous processes

62	A terminal acetylenic group can be converted to an acetyl ($CH_3C=O$) group by treatment with .....in acid medium			
	(A)	$HgSO_4$	(B)	Ag_2CO_3
	(C)	$MgSO_4$	(D)	$CaCO_3$

63	The symmetry element not possessed by chloroform is			
	(A)	C_1	(B)	C_2
	(C)	C_3	(D)	Plane of symmetry

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64	Reimer-Tiemann reaction is carried out on			
	(A)	Benzoic acids	(B)	Phenols
	(C)	Aromatic aldehydes	(D)	Aromatic carboxylic acids

65	The primary purpose of extended surfaces on a heat transfer is to			
	(A)	Block radiation	(B)	Reduce convection
	(C)	Decrease conduction	(D)	Increase the surface area for convection

66	Ethanol water system forms an azeotrope at composition of 96.5% of ethanol. The realtive volatility of the mixture at this composition is			
	(A)	1	(B)	<1
	(C)	∞	(D)	0

67	The Nusselt number (Nu) represents			
	(A)	Ratio of conductive to convective heat transfer	(B)	Ratio of convective to conductive heat transfer
	(C)	Ratio of Reynolds number to Prandtl number	(D)	Ratio of Prandtl number to Reynolds number

68	The Mollier chart is a plot of			
	(A)	Pressure Versus enthalpy	(B)	Temperature versus entropy
	(C)	Enthalpy versus entropy	(D)	Enthalpy versus temperature

69	Which of the following is a pseudohalide?			
	(A)	ICl^-	(B)	CN^-
	(C)	IF_5	(D)	I_3^-

70	The rate constant of a reaction depends on			
	(A)	Temperature	(B)	Mass
	(C)	Weight	(D)	Time

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71	Oil and grease present in an emulsified state in waste water discharged from industries can be removed by			
	(A)	Biological oxidation	(B)	skimming off
	(C)	Chemical coagulation	(D)	Chlorination

72	Which among the following does not give Cannizzaro reaction			
	(A)	Benzaldehyde	(B)	Acetaldehyde
	(C)	Salicylaldehyde	(D)	Formaldehyde

73	Gabriel phthalimide reaction is used for the synthesis of			
	(A)	Amines	(B)	Amides
	(C)	Imides	(D)	None of these

74	Which of the following nuclei is not commonly observed in NMR spectroscopy because it has a nuclear spin quantum number (I=0)?			
	(A)	^{1}H	(B)	^{13}C
	(C)	^{12}C	(D)	^{19}F

75	The technique used for separation of ortho and para nitrophenols is			
	(A)	Sublimation	(B)	Distillation
	(C)	Crystallization	(D)	Steam distillation

76	A catalyst is used			
	(A)	Only for increasing the velocity of a reaction	(B)	For altering the velocity of a reaction
	(C)	Only for decreasing the velocity of a reaction	(D)	All of above

77	Windrow is a method of solid waste disposal by			
	(A)	Sanitary land fill	(B)	Composting
	(C)	Incineration	(D)	None of these

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78	Which of the following is not a method of extinguishing fire			
	(A)	Starvation	(B)	Smothering
	(C)	Cooling	(D)	Darkening

79	A thremodynamic system is separated from the surroundings by			
	(A)	Heat	(B)	Work
	(C)	Boundary	(D)	Process

80	The Haber-Bosch ammonia synthesis process uses an iron catalyst with K_2O/Al_2O_3 promoters. The catalyst used is			
	(A)	Homogeneous catalyst	(B)	Heterogeneous catalyst
	(C)	Neither Homogeneous nor Heterogeneous	(D)	Both Homogeneous and Heterogeneous
81	Identify the control measure that is most effective for reducing exposure at the source			
	(A)	PPE	(B)	Elimination
	(C)	Training	(D)	Warning signs
82	Experimental evidence for wave nature of electrons results from			
	(A)	Plank's experiment	(B)	de Broglie's experiment
	(C)	Davison and Germer experiment	(D)	Rutherford's experiment
83	Which of the following isotherms deals with multilayer absorption			
	(A)	Langmuir	(B)	Freundlich
	(C)	BET	(D)	Gibbs
84	Saponification is the process in which			
	(A)	Fats are hydrogenated to form saturated fats	(B)	Fats and oils react with alkali to produce soap and glycerol
	(C)	Glycerol is oxidised to fatty acids	(D)	Fatty acids are esterified with alchohol
85	1000 kg of wet solids are to be dried from 60 to 20 % moisture (by weight). The mass of moisture removed in kg is			
	(A)	520	(B)	200
	(C)	400	(D)	500
86	1 gm mole of methane contains			
	(A)	6.02×10^{23} atoms of hydrogen	(B)	4 gm atom of hydrogen
	(C)	3.01×10^{23} molecules of methane	(D)	3 gm of carbon

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87	The rate of chemical reaction can be expressed as			
	(A)	The rate of disappearance of the reactants	(B)	The rate of formation of the product of the reaction
	(C)	Neither A nor B	(D)	Both A and B

88	Which act primarily regulates water pollution from industrial effluents in India			
	(A)	Air Act 1981	(B)	Water Act 1974
	(C)	Factories Act 1948	(D)	Environment Protection Act 1986

89	The number of possible chain isomers of pentane is			
	(A)	2	(B)	3
	(C)	4	(D)	5

90	The stability of carbanions is in the order			
	(A)	$1^o > 2^o > 3^o$	(B)	$3^o > 2^o > 1^o$
	(C)	$2^o > 3^o > 1^o$	(D)	$2^o > 1^o > 3^o$

91	Diffusion is a process of			
	(A)	Movement of particles from higher concentration to lower concentration	(B)	Movement of particles through semipermeable membrane
	(C)	Rarefaction of particle	(D)	Accumulation of particles on a solid surface

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92	Heat exchangers are used in			
	(A)	Radiators in automobile	(B)	Intercoolers and preheaters
	(C)	Condensers and boilers in steam plants	(D)	All of these

93	A screw compressor belongs to the positive displacement compressor type. The other name for the screw compressor is			
	(A)	Reciprocating compressor	(B)	Centrifugal compressor
	(C)	Helical axial compressor	(D)	Helical rotary compressor

94	The level of a liquid under pressure can be determined using			
	(A)	Bubbler system	(B)	Differential pressure manometer
	(C)	Diaphragm box system	(D)	Air trap system

95	The half-life period of a first order reaction is 10 min. What % of reactant remains after 1 hour			
	(A)	60.0	(B)	40.0
	(C)	3.12	(D)	1.56

96	Flow transmitters typically output which standard signal			
	(A)	0-10 V DC	(B)	0-5 psi
	(C)	4-20 mA	(D)	Digital pulse

97	Hydrometer is used to measure			
	(A)	Specific gravity of liquids	(B)	Humidity
	(C)	Water content of a solution	(D)	Conductivity of a liquid

98	Which of the following has zero dipole moment			
	(A)	Ammonia	(B)	Water
	(C)	Carbon tetrachloride	(D)	Ortho-Dichlorobenzene

99	BLEVE stands for			
	(A)	Boiling Liquid Expanding Vapour Explosion	(B)	Burning Liquid Expansion Vessel event
	(C)	Boiling Level Energy Vent Explosion	(D)	Basic Liquid Evaporation Vapour Event

100	The Acronym “PASS” used for fire extinguisher operation stands for			
	(A)	Pickup, Aim, Squeeze, Squirt	(B)	Push, Alarm, Swirl, Sweep
	(C)	Pull, Aim, Squeeze, Sweep	(D)	Pull, Aim, Swirl, Swat

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SELECTION & RECRUITMENT BOARD

Kerala Public Enterprises (Selection and Recruitment)Board
Opposite KELTRON, Vellayambalam, Thiruvananthapuram
Website: kpesrb.kerala.gov.in, Email: kpesrb@gmail.com
Tel: 0471 - 2995042

Version: C **Question Booklet No:** 09725

Name of Examination: Junior Operator **Date:** 11/10/2026

Written examination for:

(1) 097/2025, Junior Operator, Kerala Minerals and Metals Limited -T P Unit

Instructions to Candidates:

1. Candidate should not start writing answers until the indication is given to start answering.
2. The question paper contains 100 questions. Each question is provided with four choices (A), (B), (C) and (D) having one correct answer. Choose the correct answer and darken the Bubble corresponding to the question number using Blue or Black ball point pen in the OMR Sheet.
3. Each correct answer carries 1 mark. There will be no negative mark for wrong answers or unattended questions.
4. Do not write anything else on the question paper. Sheet for rough work is appended to the question paper in the end.
5. No candidate will be allowed to leave the examination hall till the end of the session and without handing over his/her Answer Sheet to the Invigilator. Candidates should ensure that the Invigilator has verified all the entries in the 'Basic Data' portion and that the Invigilator has affixed his/her signature in the space provided in the OMR sheet.

Total number of questions: **100** Maximum marks: **100** Time: **90 Minutes**

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	(A)	20	(B)	80
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2	Heat -sensitive materials can be dried using			
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5	Cement mainly contains			
	(A)	CaO, SiO_2, Al_2O_3	(B)	MgO, SiO_2, K_2O
	(C)	Al_2O_3,MgO, Fe_2O_3	(D)	CaO,MgO,K_2O
6	Sweeting of petroleum prodct means the removal of			
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7	The vapour pressure of a liquid at 100 K is 2.0 Torr. The temperature at which vapour pressure becomes 4 Torr is : (given enthalpy of vaporisation 230 R, where R is gas constant			
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8	Unimolecular gas phase surface catalysed reactions follow			
	(A)	first order kinetics at all pressures	(B)	first order kinetics at low pressures and zero order kinetics at higher pressures
	(C)	Zero order kinetics at low pressure and first order kinetics at high pressures	(D)	Zero order kinetics at all pressures
9	Among the following compounds which one undergoes Schottky defect			

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	(A)	Silver bromide	(B)	Sodium chloride
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23	Which parameter is most critical to control in boiler feedwater to minimize scale formation			
	(A)	silica concentration	(B)	feedwater temperature
	(C)	Dissolved oxygen concentration	(D)	Total dissolved solids (TDS) and hardness

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24	The orbital angular momentum of an electron in 2s orbital is			
	(A)	$-\sqrt{2}\ h/2\pi$	(B)	$h/4\pi$
	(C)	$h/2\pi$	(D)	Zero
25	Element that shows both +3 and +4 oxidation state is			
	(A)	Holmium	(B)	Cerium
	(C)	Promethium	(D)	Gadolinium
26	Hydrogen bonds are strongest in			
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	(C)	La^{3+}	(D)	Ti^{4+}

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	(A)	Less	(B)	More
	(C)	same	(D)	Infinity
34	A supercritical fluid is characterised by			
	(A)	Gas-like viscosity and liquid like density	(B)	Only gas-like viscosity
	(C)	Only liquid like density	(D)	None of the above
35	The order of a reaction can be identified using			
	(A)	Experimental data	(B)	Balanced stoichiometric equation
	(C)	Activation energy	(D)	Molecularity of the reaction
36	Rubber latex is an example of _____ fluid			
	(A)	Dilatent	(B)	Newtonian
	(C)	Pseudoplastic	(D)	Bingham plastic
37	Ammonia is manufactured by			
	(A)	Frasch Process	(B)	Haber's Process
	(C)	Le-Blanc Process	(D)	Solvay Process
38	For a single step reaction X+2Y → Products, the molecularity is			
	(A)	Zero	(B)	2
	(C)	3	(D)	1
39	When starting a centrifugal pump, the delivery valve is kept			

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	(A)	Fully open	(B)	Fully closed
	(C)	Half open	(D)	Less than half open

40	Solenoid valve works like			
	(A)	P controller	(B)	P-D controller
	(C)	P-I-D controller	(D)	On-off controller

41	Fcenter is a			
	(A)	cationic site	(B)	anionic site
	(C)	free electron	(D)	solvated electron

42	Which one of the following has largest band gap			
	(A)	Silicon	(B)	Germanium
	(C)	Tellurium	(D)	Diamond

43	If the values of the process variables associated with an operation do not change with time, then the operation is			
	(A)	Steady-state operation	(B)	Unsteady-state operation
	(C)	Cyclic operation	(D)	the process is not feasible

44	Select a suitable instrument to measure the flow rate in an open channel			
	(A)	Magnetic flow meter	(B)	Venturi meter
	(C)	Orifice meter	(D)	Triangular notch

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45	Liquified Petroleum Gas (LPG) is mainly a mixture of			
	(A)	Propane and Butane	(B)	Methane and Ethane
	(C)	Olefins and Naphthenes	(D)	Ethane and Pentane

46	In gas-solid chromatography(GSC) the basis of separation is			
	(A)	Partition	(B)	Absorption
	(C)	Adsorption	(D)	None of these

47	Which reagent should be used to produce predominantly the thermodynamic enolate from 2-methlycyclohexanone?			
	(A)	LDA/DME	(B)	Et_3N/DMF
	(C)	LDA/THF	(D)	Ph_3CLi/DME
48	The number of nodal planes in Px orbital is			
	(A)	3	(B)	2
	(C)	1	(D)	0
49	The complex species which exhibits Jahn-Teller distortion is			
	(A)	$[Mn(H_2O)_6]^{3+}$	(B)	$[Cr(H_2O)_6]^{3+}$
	(C)	$[Fe(CN)_6]^{4-}$	(D)	$[Mn(H_2O)_6]^{2+}$
50	The temperature inside a red hot furnace can be measured using			
	(A)	Mercury thermometer	(B)	Pyrometer
	(C)	Thermocouple	(D)	RTD
51	The Acronym “PASS” used for fire extinguisher operation stands for			
	(A)	Pickup, Aim, Squeeze, Squirt	(B)	Push, Alarm, Swirl, Sweep
	(C)	Pull, Aim, Squeeze, Sweep	(D)	Pull, Aim, Swirl, Swat
52	BLEVE stands for			
	(A)	Boiling Liquid Expanding Vapour Explosion	(B)	Burning Liquid Expansion Vessel event
	(C)	Boiling Level Energy Vent Explosion	(D)	Basic Liquid Evaporation Vapour Event
53	Which of the following has zero dipole moment			
	(A)	Ammonia	(B)	Water
	(C)	Carbon tetrachloride	(D)	Ortho-Dichlorobenzene
54	Hydrometer is used to measure			

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	(A)	Specific gravity of liquids	(B)	Humidity
	(C)	Water content of a solution	(D)	Conductivity of a liquid

55	Flow transmitters typically output which standard signal			
	(A)	0-10 V DC	(B)	0-5 psi
	(C)	4-20 mA	(D)	Digital pulse

56	The half-life period of a first order reaction is 10 min. What % of reactant remains after 1 hour			
	(A)	60.0	(B)	40.0
	(C)	3.12	(D)	1.56

57	The level of a liquid under pressure can be determined using			
	(A)	Bubbler system	(B)	Differential pressure manometer
	(C)	Diaphragm box system	(D)	Air trap system

58	A screw compressor belongs to the positive displacement compressor type. The other name for the screw compressor is			
	(A)	Reciprocating compressor	(B)	Centrifugal compressor
	(C)	Helical axial compressor	(D)	Helical rotary compressor

59	Heat exchangers are used in			
	(A)	Radiators in automobile	(B)	Intercoolers and preheaters
	(C)	Condensers and boilers in steam plants	(D)	All of these

60	Diffusion is a process of			
	(A)	Movement of particles from higher concentration to lower concentration	(B)	Movement of particles through semipermeable membrane
	(C)	Rarefaction of particle	(D)	Accumulation of particles on a solid surface

61	The stability of carbanions is in the order

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	(A)	$1^o>2^o>3^o$	(B)	$3^o>2^o>1^o$
	(C)	$2^o>3^o>1^o$	(D)	$2^o>1^o>3^o$

62	The number of possible chain isomers of pentane is			
	(A)	2	(B)	3
	(C)	4	(D)	5

63	Which act primarily regulates water pollution from industrial effluents in India			
	(A)	Air Act 1981	(B)	Water Act 1974
	(C)	Factories Act 1948	(D)	Environment Protection Act 1986

64	The rate of chemical reaction can be expressed as			
	(A)	The rate of disappearance of the reactants	(B)	The rate of formation of the product of the reaction
	(C)	Neither A nor B	(D)	Both A and B

65	1 gm mole of methane contains			
	(A)	$6.02x10^{23}$ atoms of hydrogen	(B)	4 gm atom of hydrogen
	(C)	$3.01x10^{23}$ molecules of methane	(D)	3 gm of carbon

66	1000 kg of wet solids are to be dried from 60 to 20 % moisture (by weight). The mass of moisture removed in kg is			
	(A)	520	(B)	200
	(C)	400	(D)	500

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67	Saponification is the process in which			
	(A)	Fats are hydrogenated to form saturated fats	(B)	Fats and oils react with alkali to produce soap and glycerol
	(C)	Glycerol is oxidised to fatty acids	(D)	Fatty acids are esterified with alchohol

68	Which of the following isotherms deals with multilayer absorption

	(A)	Langmuir	(B)	Freundlich
	(C)	BET	(D)	Gibbs

69	Experimental evidence for wave nature of electrons results from			
	(A)	Plank's experiment	(B)	de Broglie's experiment
	(C)	Davison and Germer experiment	(D)	Rutherford's experiment

70	Identify the control measure that is most effective for reducing exposure at the source			
	(A)	PPE	(B)	Elimination
	(C)	Training	(D)	Warning signs

71	The Haber-Bosch ammonia synthesis process uses an iron catalyst with K_2O/Al_2O_3 promoters. The catalyst used is			
	(A)	Homogeneous catalyst	(B)	Heterogeneous catalyst
	(C)	Neither Homogeneous nor Heterogeneous	(D)	Both Homogeneous and Heterogeneous

72	A thremodynamic system is separated from the surroundings by			
	(A)	Heat	(B)	Work
	(C)	Boundary	(D)	Process

73	Which of the following is not a method of extinguishing fire			
	(A)	Starvation	(B)	Smothering
	(C)	Cooling	(D)	Darkening

74	Windrow is a method of solid waste disposal by			
	(A)	Sanitary land fill	(B)	Composting
	(C)	Incineration	(D)	None of these

75	A catalyst is used

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	(A)	Only for increasing the velocity of a reaction	(B)	For altering the velocity of a reaction
	(C)	Only for decreasing the velocity of a reaction	(D)	All of above

76	The technique used for separation of ortho and para nitrophenols is			
	(A)	Sublimation	(B)	Distillation
	(C)	Crystallization	(D)	Steam distillation

77	Which of the following nuclei is not commonly observed in NMR spectroscopy because it has a nuclear spin quantum number (I=0)?			
	(A)	^{1}H	(B)	^{13}C
	(C)	^{12}C	(D)	^{19}F

78	Gabriel phthalimide reaction is used for the synthesis of			
	(A)	Amines	(B)	Amides
	(C)	Imides	(D)	None of these

79	Which among the following does not give Cannizzaro reaction			
	(A)	Benzaldehyde	(B)	Acetaldehyde
	(C)	Salicylaldehyde	(D)	Formaldehyde

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80	Oil and grease present in an emulsified state in waste water discharged from industries can be removed by			
	(A)	Biological oxidation	(B)	skimming off
	(C)	Chemical coagulation	(D)	Chlorination

81	The rate constant of a reaction depends on			
	(A)	Temperature	(B)	Mass
	(C)	Weight	(D)	Time

82	Which of the following is a pseudohalide?

	(A)	ICl^-	(B)	CN^-
	(C)	IF_5	(D)	I_3^-

83	The Mollier chart is a plot of			
	(A)	Pressure Versus enthalpy	(B)	Temperature versus entropy
	(C)	Enthalpy versus entropy	(D)	Enthalpy versus temperature

84	The Nusselt number (Nu) represents			
	(A)	Ratio of conductive to convective heat transfer	(B)	Ratio of convective to conductive heat transfer
	(C)	Ratio of Reynolds number to Prandtl number	(D)	Ratio of Prandtl number to Reynolds number

85	Ethanol water system forms an azeotrope at composition of 96.5% of ethanol. The realtive volatility of the mixture at this composition is			
	(A)	1	(B)	<1
	(C)	∞	(D)	0

86	The primary purpose of extended surfaces on a heat transfer is to			
	(A)	Block radiation	(B)	Reduce convection
	(C)	Decrease conduction	(D)	Increase the surface area for convection

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87	Reimer-Tiemann reaction is carried out on			
	(A)	Benzoic acids	(B)	Phenols
	(C)	Aromatic aldehydes	(D)	Aromatic carboxylic acids

88	The symmetry element not possessed by chloroform is			
	(A)	C_1	(B)	C_2
	(C)	C_3	(D)	Plane of symmetry

89	A terminal acetylenic group can be converted to an acetyl ($CH_3C=O$) group by treatment with .....in acid medium

	(A)	$HgSO_4$	(B)	Ag_2CO_3
	(C)	$MgSO_4$	(D)	$CaCO_3$

90	The major limitation of the first law of thermodynamics is that it does not consider			
	(A)	Heat as a form of energy	(B)	Rate of change of a process
	(C)	Direction of change	(D)	Spontaneous processes

91	Heat is transferred from an electric bulb by			
	(A)	Conduction	(B)	Convection
	(C)	Radiation	(D)	All of these

92	Flash distillation is			
	(A)	same as differential distillation	(B)	Used for multicomponent systems like crude refining
	(C)	same as simple distillation	(D)	Most useful in handling binary systems

93	Identify the ASME section that covers process piping			
	(A)	ASME B31.3	(B)	SME Section VIII Div I
	(C)	ASME Section 1	(D)	ASME B16.5

94	Cavitation in centrifugal pumps occurs when the pressure at the impeller eye			
	(A)	Drops below the fluid vapour pressure	(B)	Drops below the atmospheric pressure
	(C)	Drops below the pump design pressure	(D)	Drops below the operating pressure

95	With an increase in pressure, the latent heat of vaporization of a liquid			
	(A)	Increases	(B)	Decreases
	(C)	Remains constant	(D)	Spontaneously drops to zero

96	A reactor is fed with 100 kmol of SO_2 and 100 kmol of O_2 to produce SO_3. The rpduct stream contains 50 kmol SO_3. The percentage conversion of SO_2 is

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	(A)	25%	(B)	50%
	(C)	75%	(D)	100%

97	Fructose gives a positive Tollen's test because			
	(A)	It contains an aldehyde group	(B)	It is oxidised directly without structural change
	(C)	It undergoes keto-enol tautomerism in alkaline medium to form aldoses	(D)	It contains two carbonyl groups

98	A reaction showed a 10-fold increase in rate constant when the temperature was raised from 400 K to 500K. The activation energy of the reaction is approximately			
	(A)	400 kJ	(B)	100kJ
	(C)	40kJ	(D)	25kJ

99	The osmotic pressure (π) of a polymer solution was determined at different concentration (c). π /c was plotted against c and its limiting value corresponding to c tending to zero was 18.6 mm water $dm^3 g^{-1}$. The molar mass of the polymer in kg mol^{-1} is			
	(A)	150	(B)	100
	(C)	50	(D)	10

100	The losses for flow through valves and fitting are expressed in terms of			
	(A)	drag coefficient	(B)	equivalent length of a straight pipe
	(C)	Shape factor	(D)	roughness factor

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SELECTION & RECRUITMENT BOARD

Kerala Public Enterprises (Selection and Recruitment)Board
Opposite KELTRON, Vellayambalam, Thiruvananthapuram
Website: kpesrb.kerala.gov.in, Email: kpesrb@gmail.com
Tel: 0471 - 2995042

Version: D **Question Booklet No:** 09725

Name of Examination: Junior Operator **Date:** 11/10/2026

Written examination for:

(1) 097/2025, Junior Operator, Kerala Minerals and Metals Limited -T P Unit

Instructions to Candidates:

1. Candidate should not start writing answers until the indication is given to start answering.
2. The question paper contains 100 questions. Each question is provided with four choices (A), (B), (C) and (D) having one correct answer. Choose the correct answer and darken the Bubble corresponding to the question number using Blue or Black ball point pen in the OMR Sheet.
3. Each correct answer carries 1 mark. There will be no negative mark for wrong answers or unattended questions.
4. Do not write anything else on the question paper. Sheet for rough work is appended to the question paper in the end.
5. No candidate will be allowed to leave the examination hall till the end of the session and without handing over his/her Answer Sheet to the Invigilator. Candidates should ensure that the Invigilator has verified all the entries in the 'Basic Data' portion and that the Invigilator has affixed his/her signature in the space provided in the OMR sheet.

Total number of questions: **100** Maximum marks: **100** Time: **90 Minutes**

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1	Reimer-Tiemann reaction is carried out on			
	(A)	Benzoic acids	(B)	Phenols
	(C)	Aromatic aldehydes	(D)	Aromatic carboxylic acids

2	Cavitation in centrifugal pumps occurs when the pressure at the impeller eye			
	(A)	Drops below the fluid vapour pressure	(B)	Drops below the atmospheric pressure
	(C)	Drops below the pump design pressure	(D)	Drops below the operating pressure

3	Which of the following isotherms deals with multilayer absorption			
	(A)	Langmuir	(B)	Freundlich
	(C)	BET	(D)	Gibbs
4	Main pollutant present in the automobile exhaust is			
	(A)	CO	(B)	CO_2
	(C)	NO	(D)	Hydrocarbons
5	Cement mainly contains			
	(A)	CaO, SiO_2, Al_2O_3	(B)	MgO, SiO_2, K_2O
	(C)	Al_2O_3,MgO, Fe_2O_3	(D)	CaO,MgO,K_2O
6	With an increase in pressure, the latent heat of vaporization of a liquid			
	(A)	Increases	(B)	Decreases
	(C)	Remains constant	(D)	Spontaneously drops to zero
7	For a hydraulically smooth pipe, the friction factor for turbulent flow			
	(A)	Depends only on the Reynolds number	(B)	Depends only on relative roughness
	(C)	Do not depend on the Reynolds number	(D)	Is a constant
8	The Haber-Bosch ammonia synthesis process uses an iron catalyst with K_2O/Al_2O_3 promoters. The catalyst used is			
	(A)	Homogeneous catalyst	(B)	Heterogeneous catalyst
	(C)	Neither Homogeneous nor Heterogeneous	(D)	Both Homogeneous and Heterogeneous
9	Which among the following does not give Cannizzaro reaction			
	(A)	Benzaldehyde	(B)	Acetaldehyde
	(C)	Salicylaldehyde	(D)	Formaldehyde

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10	For a single step reaction X+2Y → Products, the molecularity is			
	(A)	Zero	(B)	2
	(C)	3	(D)	1

11	The osmotic pressure (π) of a polymer solution was determined at different concentration (c). π /c was plotted against c and its limiting value corresponding to c tending to zero was 18.6 mm water $dm^3 g^{-1}$. The molar mass of the polymer in kg mol^{-1} is			
	(A)	150	(B)	100
	(C)	50	(D)	10

12	Gabriel phthalimide reaction is used for the synthesis of			
	(A)	Amines	(B)	Amides
	(C)	Imides	(D)	None of these

13	Thermocouple should be checked periodically when used at elevated temperature due to			
	(A)	Resolution	(B)	Accuracy
	(C)	Drift	(D)	None of these

14	The vapour pressure of a liquid at 100 K is 2.0 Torr. The temperature at which vapour pressure becomes 4 Torr is : (given enthalpy of vaporisation 230 R, where R is gas constant			
	(A)	143 K	(B)	201 K
	(C)	303 K	(D)	402 K

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15	Concentration of solids in the boiler drum is controlled by			
	(A)	Condensate recovery	(B)	Reducing dosage of chemicals
	(C)	Steam venting	(D)	Blow down

16	When starting a centrifugal pump, the delivery valve is kept			
	(A)	Fully open	(B)	Fully closed
	(C)	Half open	(D)	Less than half open

17	Ammonia is manufactured by			
	(A)	Frasch Process	(B)	Haber's Process
	(C)	Le-Blanc Process	(D)	Solvay Process

18	The main constitutents of Portland cement are calcium aluminate and			
	(A)	Aluminium silicate	(B)	Sodium silicate
	(C)	Carbonates	(D)	Calcium silicate

19	Hydrometer is used to measure			
	(A)	Specific gravity of liquids	(B)	Humidity
	(C)	Water content of a solution	(D)	Conductivity of a liquid

20	Which type of water pollutant is most directly responsible for causing eutrophication in lakes and rivers			
	(A)	Excess nutrients	(B)	Suspended solids
	(C)	Oil spills	(D)	Thermal pollution from discharging hot water

21	ZnO is an example for			
	(A)	n type semiconductor	(B)	p type semiconductor
	(C)	insulator	(D)	superconductor

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22	The number of nodal planes in Px orbital is			
	(A)	3	(B)	2
	(C)	1	(D)	0

23	Which of the following cations is coloured in aqueous solution?			
	(A)	Cu^{+}	(B)	Ni^{2+}
	(C)	La^{3+}	(D)	Ti^{4+}

24	Among the following compounds which one undergoes Schottky defect

	(A)	Silver bromide	(B)	Sodium chloride
	(C)	Zinc oxide	(D)	Sulphide

25	BLEVE stands for			
	(A)	Boiling Liquid Expanding Vapour Explosion	(B)	Burning Liquid Expansion Vessel event
	(C)	Boiling Level Energy Vent Explosion	(D)	Basic Liquid Evaporation Vapour Event

26	Purging operation is performed on recycle stream for			
	(A)	Increasing yield	(B)	Reducing the accumulation of inerts
	(C)	Conserving heat	(D)	Improving efficiency

27	A reactor is fed with 100 kmol of SO_2 and 100 kmol of O_2 to produce SO_3. The rpduct stream contains 50 kmol SO_3. The percentage conversion of SO_2 is			
	(A)	25%	(B)	50%
	(C)	75%	(D)	100%

28	Identify the control measure that is most effective for reducing exposure at the source			
	(A)	PPE	(B)	Elimination
	(C)	Training	(D)	Warning signs

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29	For a binary distillation column with a relative volatility a = 1.5 throughout the column, compared to a=2.0, the minimum number of theoretical stages required will be			
	(A)	Less	(B)	More
	(C)	same	(D)	Infinity

30	The flash point of a fuel indicates its			
	(A)	Cetane number	(B)	Energy content
	(C)	Grade of fuel	(D)	Flammability hazard

31	In an acid buffer solution, if some $H_2 SO_4$ is added, its pH will

	(A)	Remains constant	(B)	Change but cannot be predicted
	(C)	Decrease	(D)	Increase

32	Bohr's atomic model can explain			
	(A)	The spectrum of hydrogen atom only	(B)	The spectrum of an atom or ion containing one electron only
	(C)	The spectrum of hydrogen molecule	(D)	The solar spectrum

33	The losses for flow through valves and fitting are expressed in terms of			
	(A)	drag coefficient	(B)	equivalent length of a straight pipe
	(C)	Shape factor	(D)	roughness factor

34	A catalyst is used			
	(A)	Only for increasing the velocity of a reaction	(B)	For altering the velocity of a reaction
	(C)	Only for decreasing the velocity of a reaction	(D)	All of above

35	Fructose gives a positive Tollen's test because			
	(A)	It contains an aldehyde group	(B)	It is oxidised directly without structural change
	(C)	It undergoes keto-enol tautomerism in alkaline medium to form aldoses	(D)	It contains two carbonyl groups

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36	The symmetry element not possessed by chloroform is			
	(A)	C_1	(B)	C_2
	(C)	C_3	(D)	Plane of symmetry

37	Packing efficiency (%) of fcc crystal is			
	(A)	53.3	(B)	68
	(C)	74.0	(D)	100

38	The number of possible chain isomers of pentane is

	(A)	2	(B)	3
	(C)	4	(D)	5

39	Rubber latex is an example of _____ fluid			
	(A)	Dilatent	(B)	Newtonian
	(C)	Pseudoplastic	(D)	Bingham plastic

40	1 gm mole of methane contains			
	(A)	6.02×10^{23} atoms of hydrogen	(B)	4 gm atom of hydrogen
	(C)	3.01×10^{23} molecules of methane	(D)	3 gm of carbon

41	Heat exchangers are used in			
	(A)	Radiators in automobile	(B)	Intercoolers and preheaters
	(C)	Condensers and boilers in steam plants	(D)	All of these

42	Heat is transferred from an electric bulb by			
	(A)	Conduction	(B)	Convection
	(C)	Radiation	(D)	All of these

43	The rate constant of a reaction depends on			
	(A)	Temperature	(B)	Mass
	(C)	Weight	(D)	Time

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44	Sweeting of petroleum prodct means the removal of			
	(A)	Sulphur and its compounds	(B)	Water
	(C)	Organic impurities	(D)	Wax

45	Which reagent should be used to produce predominantly the thermodynamic enolate from 2-methlycyclohexanone?

	(A)	LDA/DME	(B)	Et_3N/DMF
	(C)	LDA/THF	(D)	Ph_3CLi/DME

46	The order of a reaction can be identified using			
	(A)	Experimental data	(B)	Balanced stoichiometric equation
	(C)	Activation energy	(D)	Molecularity of the reaction

47	Fcenter is a			
	(A)	cationic site	(B)	anionic site
	(C)	free electron	(D)	solvated electron

48	The level of a liquid under pressure can be determined using			
	(A)	Bubbler system	(B)	Differential pressure manometer
	(C)	Diaphragm box system	(D)	Air trap system

49	The process used to improve the flow properties of fuel oil in a refinery is called			
	(A)	visbreaking	(B)	Hydrocracking
	(C)	Steam reforming	(D)	Alkylation

50	Ethanol water system forms an azeotrope at composition of 96.5% of ethanol. The realtive volatility of the mixture at this composition is			
	(A)	1	(B)	<1
	(C)	∞	(D)	0

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51	The major limitation of the first law of thermodynamics is that it does not consider			
	(A)	Heat as a form of energy	(B)	Rate of change of a process
	(C)	Direction of change	(D)	Spontaneous processes

52	Which of the following is not a method of extinguishing fire			
	(A)	Starvation	(B)	Smothering
	(C)	Cooling	(D)	Darkening

53	The Fourdrinier machine is used in the manufacture of			
	(A)	Sugar	(B)	Paper
	(C)	Alcohol from molasses	(D)	Antibiotics
54	Hydrogen bonds are strongest in			
	(A)	O _____ H - - - S	(B)	S _____ H - - - O
	(C)	F _____ H - - - F	(D)	F _____ H - - - O
55	Which of the following nuclei is not commonly observed in NMR spectroscopy because it has a nuclear spin quantum number (I=0)?			
	(A)	^{1}H	(B)	^{13}C
	(C)	^{12}C	(D)	^{19}F
56	The primary purpose of extended surfaces on a heat transfer is to			
	(A)	Block radiation	(B)	Reduce convection
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57	If the values of the process variables associated with an operation do not change with time, then the operation is			
	(A)	Steady-state operation	(B)	Unsteady-state operation
	(C)	Cyclic operation	(D)	the process is not feasible
58	The stability of carbanions is in the order			
	(A)	$1^{o}>2^{o}>3^{o}$	(B)	$3^{o}>2^{o}>1^{o}$
	(C)	$2^{o}>3^{o}>1^{o}$	(D)	$2^{o}>1^{o}>3^{o}$
59	The orbital angular momentum of an electron in 2s orbital is			
	(A)	$-\sqrt{2}\ h/2\pi$	(B)	$h/4\pi$
	(C)	$h/2\pi$	(D)	Zero
60	The strongest reducing ion among the following is			

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	(A)	U^{3+}	(B)	Am^{3+}
	(C)	Sm^{3+}	(D)	Cr^{3+}

61	Heat -sensitive materials can be dried using			
	(A)	Indirect drying	(B)	Freeze drying
	(C)	Spray drying	(D)	None of these

62	Hydrocracking employs			
	(A)	High pressure and temperature	(B)	Low pressure and temperature
	(C)	High pressure and low temperature	(D)	High temperature and low pressure

63	The number of unpaired electrons present in $K_3[Fe(CN)_6]$ is			
	(A)	0	(B)	3
	(C)	5	(D)	1

64	Flow transmitters typically output which standard signal			
	(A)	0-10 V DC	(B)	0-5 psi
	(C)	4-20 mA	(D)	Digital pulse

65	Which act primarily regulates water pollution from industrial effluents in India			
	(A)	Air Act 1981	(B)	Water Act 1974
	(C)	Factories Act 1948	(D)	Environment Protection Act 1986

66	Which parameter is most critical to control in boiler feedwater to minimize scale formation			
	(A)	silica concentration	(B)	feedwater temperature
	(C)	Dissolved oxygen concentration	(D)	Total dissolved solids (TDS) and hardness

67	Windrow is a method of solid waste disposal by

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	(A)	Sanitary land fill	(B)	Composting
	(C)	Incineration	(D)	None of these

68	The Nusselt number (Nu) represents			
	(A)	Ratio of conductive to convective heat transfer	(B)	Ratio of convective to conductive heat transfer
	(C)	Ratio of Reynolds number to Prandtl number	(D)	Ratio of Prandtl number to Reynolds number

69	Which of the following is a pseudohalide?			
	(A)	ICl^-	(B)	CN^-
	(C)	IF_5	(D)	I_3^-

70	Amount of Cu (in mg) deposited by passing 20 mA of current through aq. Copper sulphate solution for 10 minutes			
	(A)	96.5	(B)	3.92
	(C)	3.15	(D)	63.5

71	Unimolecular gas phase surface catalysed reactions follow			
	(A)	first order kinetics at all pressures	(B)	first order kinetics at low pressures and zero order kinetics at higher pressures
	(C)	Zero order kinetics at low pressure and first order kinetics at high pressures	(D)	Zero order kinetics at all pressures

72	The following type of bonding is strongly directional in solids			
	(A)	Metallic bonding	(B)	Ionic bonding
	(C)	Covalent bonding	(D)	Van der Waal's bonding

73	The half-life period of a first order reaction is 10 min. What % of reactant remains after 1 hour

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	(A)	60.0	(B)	40.0
	(C)	3.12	(D)	1.56

74	Identify the instrument that can be used for measuring point velocity

	(A)	pitot tube	(B)	Orifice meter
	(C)	Rotameter	(D)	Venturi meter

75	A terminal acetylenic group can be converted to an acetyl ($CH_3C=O$) group by treatment with .....in acid medium

	(A)	$HgSO_4$	(B)	Ag_2CO_3
	(C)	$MgSO_4$	(D)	$CaCO_3$

76	Solenoid valve works like

	(A)	P controller	(B)	P-D controller
	(C)	P-I-D controller	(D)	On-off controller

77	Flash distillation is

	(A)	same as differential distillation	(B)	Used for multicomponent systems like crude refining
	(C)	same as simple distillation	(D)	Most useful in handling binary systems

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78	In gas-solid chromatography(GSC) the basis of separation is

	(A)	Partition	(B)	Absorption
	(C)	Adsorption	(D)	None of these

79	The Mollier chart is a plot of

	(A)	Pressure Versus enthalpy	(B)	Temperature versus entropy
	(C)	Enthalpy versus entropy	(D)	Enthalpy versus temperature

80	Element that shows both +3 and +4 oxidation state is

	(A)	Holmium	(B)	Cerium
	(C)	Promethium	(D)	Gadolinium

81	The complex species which exhibits Jahn-Teller distortion is			
	(A)	$[Mn(H_2O)_6]^{3+}$	(B)	$[Cr(H_2O)_6]^{3+}$
	(C)	$[Fe(CN)_6]^{4-}$	(D)	$[Mn(H_2O)_6]^{2+}$

82	A screw compressor belongs to the positive displacement compressor type. The other name for the screw compressor is			
	(A)	Reciprocating compressor	(B)	Centrifugal compressor
	(C)	Helical axial compressor	(D)	Helical rotary compressor

83	A reaction showed a 10-fold increase in rate constant when the temperature was raised from 400 K to 500K. The activation energy of the reaction is approximately			
	(A)	400 kJ	(B)	100kJ
	(C)	40kJ	(D)	25kJ

84	Liquified Petroleum Gas (LPG) is mainly a mixture of			
	(A)	Propane and Butane	(B)	Methane and Ethane
	(C)	Olefins and Naphthenes	(D)	Ethane and Pentane

85	A supercritical fluid is characterised by			
	(A)	Gas-like viscosity and liquid like density	(B)	Only gas-like viscosity
	(C)	Only liquid like density	(D)	None of the above

86	Diffusion is a process of			
	(A)	Movement of particles from higher concentration to lower concentration	(B)	Movement of particles through semipermeable membrane
	(C)	Rarefaction of particle	(D)	Accumulation of particles on a solid surface

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87	1000 kg of wet solids are to be dried from 60 to 20 % moisture (by weight). The mass of moisture removed in kg is			
	(A)	520	(B)	200
	(C)	400	(D)	500

88	Experimental evidence for wave nature of electrons results from			
	(A)	Plank's experiment	(B)	de Broglie's experiment
	(C)	Davison and Germer experiment	(D)	Rutherford's experiment

89	The rate of chemical reaction can be expressed as			
	(A)	The rate of disappearance of the reactants	(B)	The rate of formation of the product of the reaction
	(C)	Neither A nor B	(D)	Both A and B

90	A thremodynamic system is separated from the surroundings by			
	(A)	Heat	(B)	Work
	(C)	Boundary	(D)	Process

91	The temperature inside a red hot furnace can be measured using			
	(A)	Mercury thermometer	(B)	Pyrometer
	(C)	Thermocouple	(D)	RTD

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92	Saponification is the process in which			
	(A)	Fats are hydrogenated to form saturated fats	(B)	Fats and oils react with alkali to produce soap and glycerol
	(C)	Glycerol is oxidised to fatty acids	(D)	Fatty acids are esterified with alchohol

93	Which one of the following has largest band gap			
	(A)	Silicon	(B)	Germanium
	(C)	Tellurium	(D)	Diamond

94	The Acronym "PASS" used for fire extinguisher operation stands for			
	(A)	Pickup, Aim, Squeeze, Squirt	(B)	Push, Alarm, Swirl, Sweep
	(C)	Pull, Aim, Squeeze, Sweep	(D)	Pull, Aim, Swirl, Swat
95	Identify the ASME section that covers process piping			
	(A)	ASME B31.3	(B)	SME Section VIII Div I
	(C)	ASME Section 1	(D)	ASME B16.5
96	In the production of sulphur trioxide 100 kmol of SO_2 and 200 kmol of O_2 are fed to a reactor. The product stream is found to contain 80 kmol SO_3. What is the percentage conversion of SO_2			
	(A)	20	(B)	80
	(C)	40	(D)	60
97	Oil and grease present in an emulsified state in waste water discharged from industries can be removed by			
	(A)	Biological oxidation	(B)	skimming off
	(C)	Chemical coagulation	(D)	Chlorination
98	Select a suitable instrument to measure the flow rate in an open channel			
	(A)	Magnetic flow meter	(B)	Venturi meter
	(C)	Orifice meter	(D)	Triangular notch
99	The technique used for separation of ortho and para nitrophenols is			
	(A)	Sublimation	(B)	Distillation
	(C)	Crystallization	(D)	Steam distillation
100	Which of the following has zero dipole moment			
	(A)	Ammonia	(B)	Water
	(C)	Carbon tetrachloride	(D)	Ortho-Dichlorobenzene

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